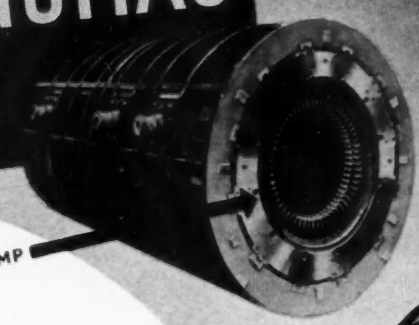
ELECTRICAL TIMES

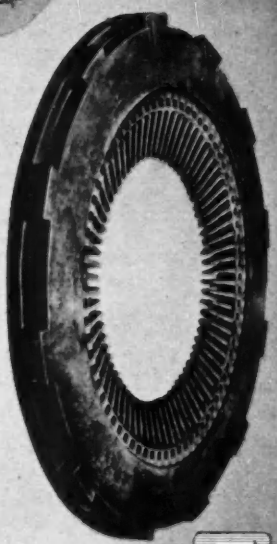
THURSDAY
17 JULY
1952
NINEPENCE

FERRANTI NOMAG

Non-Magnetic
CAST IRON



FERRANTI NOMAG STATOR END CLAMP



For the B.E.A. Stourport power station, English Electric Company Ltd. engineers specified Ferranti Nomag for the stator end clamps. It has proved to be eminently suitable for this and innumerable other applications in the electrical industry because of its unique combination of qualities. Nomag characteristics are:

Resistivity	*150 microhms per cm cube*
Resistance-temperature coefficient	*Between 0°C and 100°C per °C = ·00045*
Physical toughness	*Izod value 29 ft. lb.*
Maximum magnetic permeability	1·03

Good machining properties

FERRANTI LTD

HOLLINWOOD · LANCASHIRE
LONDON OFFICE: KERN HOUSE, KINGSWAY W.C.2

F
FERRANTI

Industry's most versatile welding tool . . . Studs welded with the Nelson Gun show savings in time and money compared with bolts, pins, rivets or normal studs. You can use this new technique for every job of fixing to steel. The gun is light, easy to handle and calls for no welding skill. Already it is in use in every industry where steel is fabricated. The equipment comprises gun, control box and cables. Your existing D.C. welding set will drive it or the specially designed C.P. rectifier can be used.

NELSON STUD WELDING SERVICE

Crompton Parkinson LIMITED

CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2

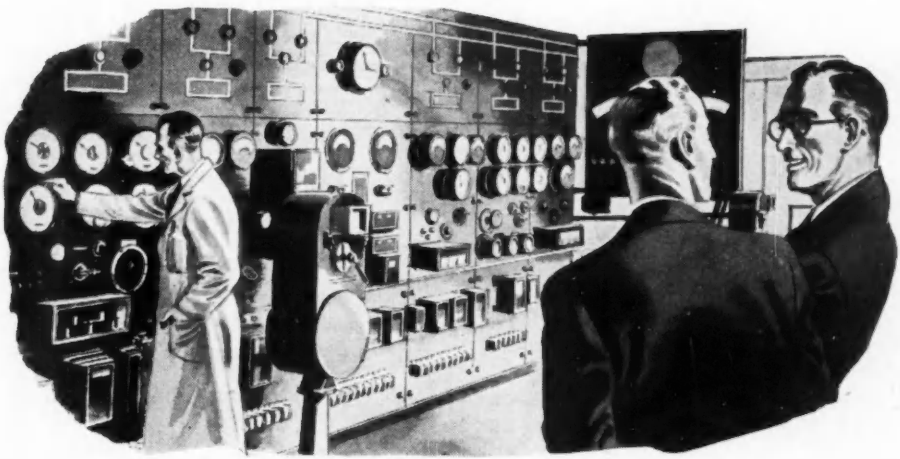
Phone: CHAncery 3333 Grams: Crompark, Estrand, London

...and not a penny on battery repairs in 12 years*?

Yes—AND 740 cells in use

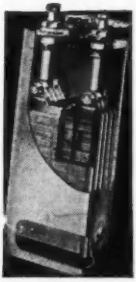
What's so special about Nife?

They're made of STEEL—an engineering job



** These are the actual details of the performance of Nife batteries operated by a Municipal Authority.*

Every Nife battery is a superb example of precision engineering in steel. This technical perfection is the reason why there is 'longer life in a Nife'—and almost complete freedom from replacement costs.



ROBUST CONSTRUCTION Made of steel — case and plates — a Nife battery has enormous mechanical strength.

COMPLETE RELIABILITY The almost inert electrolyte is actually a steel preservative—so that the battery does not deteriorate even during long periods of inactivity. It will withstand the heaviest rates of charge or discharge — and recover its voltage almost immediately.

SIMPLE MAINTENANCE A Nife is, for all practical purposes, free from self-discharge — the steel plates cannot buckle or shed active material and there is no corrosion of terminals.

(N.B. Nife Batteries are not yet available for private cars or domestic radio.)

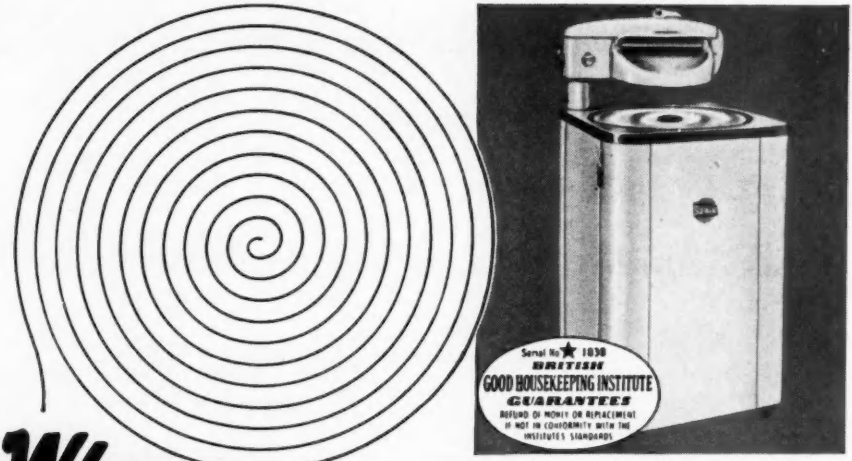
N25

NIFE STEEL BATTERIES

REPAY THEIR ORIGINAL COST MANY TIMES OVER

NIFE BATTERIES · REDDITCH · WORCESTERSHIRE

A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BRITISH
GOOD HOUSEKEEPING INSTITUTE
GUARANTEES
REFUND OF MONEY OR REPLACEMENT IF NOT IN CONFORMITY WITH THE INSTITUTE'S STANDARDS

Why *is this latest Swirlux 503 the perfect washing machine for present day market conditions ?*

Please write to the sole Manufacturers for the complete answer

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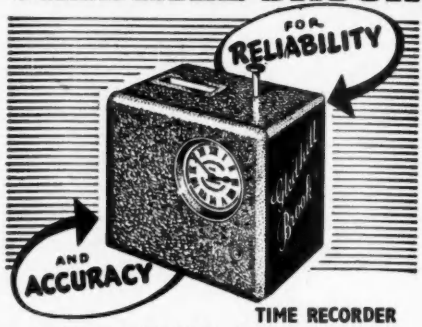
Telephone: Burnley 3121-2. 3203

SWIRLUX

n.d.h.

GLEDHILL-BROOK



TIME RECORDER

SPECIALLY DESIGNED FOR SMALL STAFFS

This useful GLEDHILL-BROOK Recorder is a handy portable size for small staffs. It records IN and OUT attendances as well as ON or OFF jobs. The clear and accurate time record is on the face of the card.

Available with an eight-day "G.B." mechanical clock movement with best quality lever escapement or the well-known "G.B." electric impulse movement. Soundly constructed in an all-steel case with cellulose finish.

Enquiries to:—

GLEDHILL-BROOK TIME RECORDERS LTD.

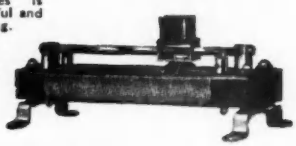
60, EMPIRE WORKS • HUDDERSFIELD

IT IS A "CRESSALL-PRODUCT"

CRESSALL Resistances incorporate the soundest electrical and mechanical principles in design—yet prices are competitive.

CRESSALL Resistance

List No. 80 containing data and prices of our standard sliding Resistances is both useful and interesting. May we send you a copy ?



CRESSALL

Registered Trade Name of

THE CRESSALL MANUFACTURING CO. LTD.
TOWER STREET BIRMINGHAM 19
TELEPHONE: ASTON CROSS 2668 (3 lines)
TELEGRAMS: "OHMIC" BIRMINGHAM

Positively

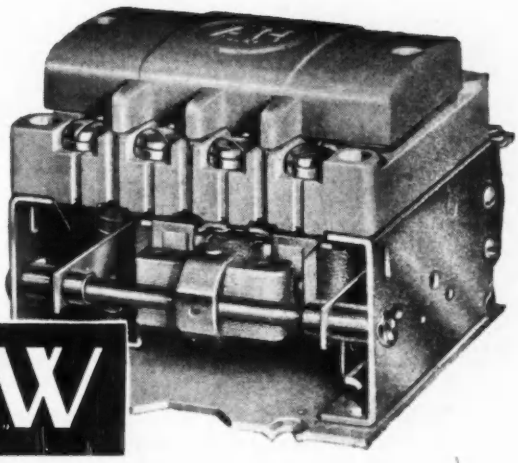
the simplest and best design in

CONTACTORS

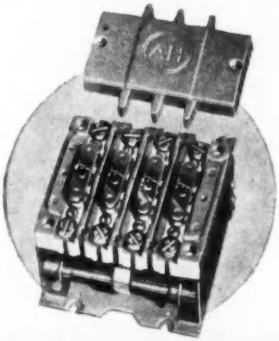
TYPE 'RA'

by

ARROW



-this design offers you-



- **A 50% saving in space over conventional types.**
- **A free-floating magnet with guided contact alignment.**
- **And a score of other good features.**

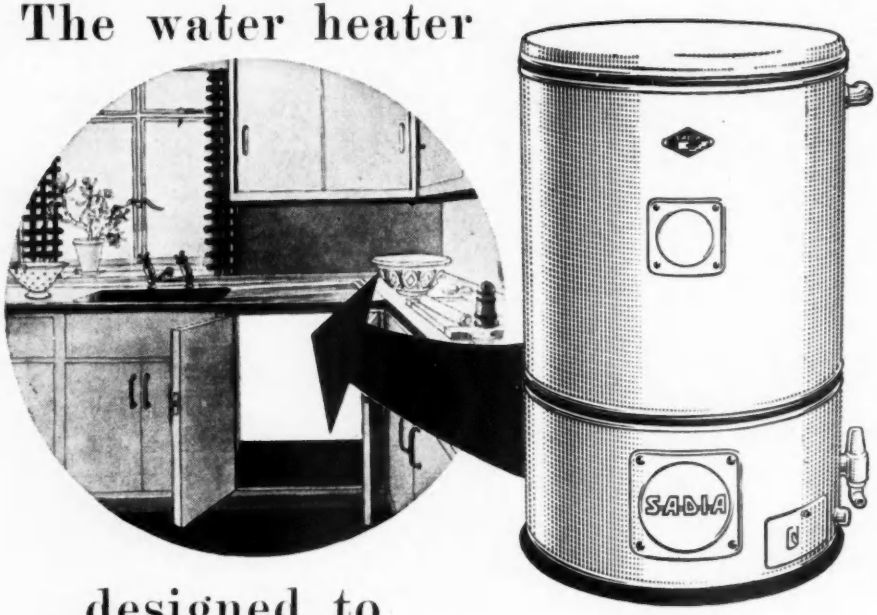
Three sizes: 25, 50 and 100 amps.
(25 amp. size only $3\frac{1}{2}$" x $3\frac{1}{2}$" x $3\frac{1}{4}$")

Write TODAY for full particulars.

ARROW ELECTRIC SWITCHES LTD

HANGER LANE · EALING
LONDON · W.5
Telephone: Perivale 4451

The water heater



designed to save SPACE and save ELECTRICITY

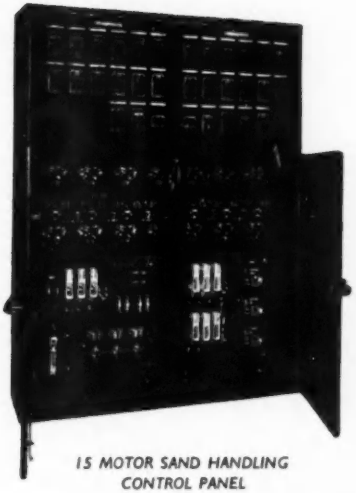
Thirteen years ago, Sadia designed an electric water heater 33″ high and 20″ in diameter to fit under the draining board in the kitchen. The compact type UDB Sadia utilised space which had hitherto been largely wasted.

Two independent heating units make this Sadia very economical to run. A small upper unit of only 500 watts, controlled automatically by a thermostat, maintains a plentiful supply of hot water for the sink whilst a lower unit of 2,500 watts need only be switched on when larger quantities of hot water are required for the bath or washing machine. A thermostat is also provided for the lower unit to avoid waste of electricity once the water is heated.

The original design of the Sadia type UDB is now accepted practice. The modern Sadia incorporates many refinements and after 29 years of progressive leadership in electric water heating Sadia still leads the field in design, quality and performance.

SADIA
HOT WATER BY ELECTRICITY

AIDAS ELECTRIC LIMITED, *Sadia Works, Rowdell Road, Northolt, Middlesex.* SCOTTISH AGENTS: *W. Brown & Co. (Engineers) Ltd., 89, Douglas Street, Glasgow, C.2.* MANUFACTURED IN SOUTH AFRICA *by: Sadia Water Heaters (Pty) Ltd., 3-5, Newton Street, Village Main, Johannesburg.*



15 MOTOR SAND HANDLING CONTROL PANEL

IGRANIC ELECTRIC CONTROL GEAR

FOR . . .

EFFICIENT PROTECTION

OF VALUABLE MACHINERY AND FOR RELIABILITY SPECIFY....

IGRANIC CONTROL

OUR DISTRICT OFFICE STAFFS OF SPECIALIST ENGINEERS ARE READILY AVAILABLE TO ADVISE YOU ON THE SELECTION OF CONTROL GEAR APPROPRIATE TO YOUR PARTICULAR NEEDS

SPECIALISED CONTROL EQUIPMENT FOR....

- AIR COMPRESSORS
- BLAST FURNACES
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- COAL HANDLING
- COKE OVENS
- FOUNDRIES
- LIFTS
- LAUNDRIES
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MOTOR IGRANIC CONTROL

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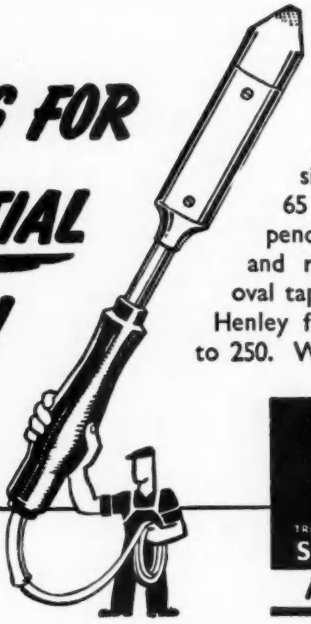
B

SOLONS FOR ESSENTIAL JOBS!



Use SOLONS for the jobs that matter — this modern precision tool makes soldering speedier, simpler and more reliable. 5 models: 65 watt with oval tapered and round pencil bit; 125 watt with oval tapered and round pencil bit; 240 watt with oval tapered bit; each with 6 feet 3-core Henley flexible. Voltage ranges from 100 to 250. Write for folder Y.10.

HENLEY SOLON ELECTRIC TRADE MARK
SOLDERING IRONS
FOR INDUSTRIAL USE

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.,
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We invite your enquiries for

ROTARY SWITCHES

FOR ALL APPLICATIONS:

ARMAMENTS
COOKERS
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Deliveries:
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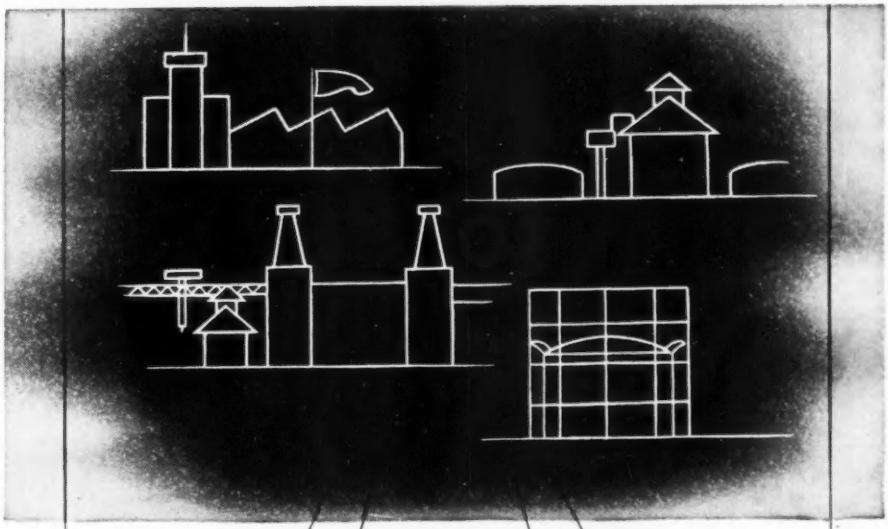
S. DAVALL & SONS LTD. EST. 1884

264/270 St. John Street, Clerkenwell, London, E.C.1 **Phone: Clerkenwell 2917-3760**



One man two wires —that means complete control

"A.T.M." Supervisory Remote Indication and Control Equipment is a flexible and versatile system for controlling a large variety of operations over practically any distance using two wires which may also be used as telephone lines. For example, the control engineer has the following facilities: closing and tripping of circuit breakers, starting and stopping of machines, voltage control through transformer tap change equipment, fault condition warning, all essential metering, etc.

Supervisory Remote Indication and Control Equipment

AUTOMATIC TELEPHONE & ELECTRIC CO. LTD., Strowger House, Arundel St., London, W.C.2.
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TRADE MARK

HIGGS MOTORS LTD

CHAIRMAN WALTER F. HIGGS M.I.E.E.

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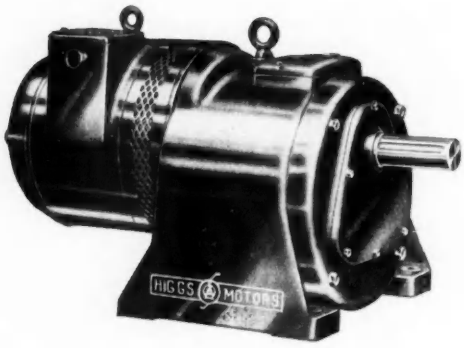


From ½ to 30 h.p.

From 9 r.p.m.

Select a Higgs unit
for that slow speed
drive.

GUARANTEED FOR EVER

Belfast, Birmingham, Bristol, Dundee, Glasgow, London, Manchester, Newcastle, Peterborough, Sheffield, Wolverhampton

Electricity

and Prosperity

TODAY the prime task is to increase the strength and prosperity of the nation. To do that more electric power is needed . . . power for rearmament, for more exports and for the increasing needs of industrial, commercial and domestic consumers . . .

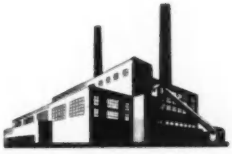
More power is on the way. Of 59 new Power Stations planned to be in commission by the end of 1957, some 25 will be in operation by 31st December next. Plant installations this year should provide an extra 1,250,000 kW — even more than last year's record.

We cannot rely on the weather

Last winter, thanks to the co-operation of all consumers, the good fortune of mild weather and the special efforts of British Electricity, there were practically no power cuts. Unfortunately, we cannot rely on mild weather again. British Electricity are once more making special efforts to ensure that the maximum generating capacity will be available in the coming winter, and Industry is asked to take heed *now:* to ensure that the most effective and efficient use of power is being made at all times. **We must all avoid waste. Then we can hope for a 'cut-free' winter.**

PLAN **NOW**

FOR MAXIMUM WINTER PRODUCTION



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ENGRAVED PLATES
OF ALL TYPES & IN ALL LANGUAGES

ENAMELLED - ENGRAVED - PLASTICS
CAST - DIECAST - BRONZE

EDWARD H. THEW LTD.

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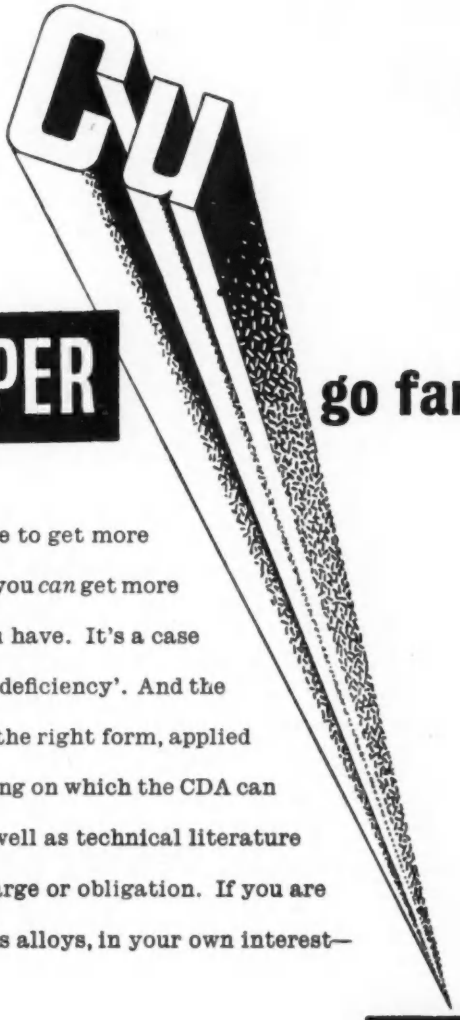
TELEgrams: "Engraving, Gateshead-on-Tyne"

Turnright *for* COOKER SWITCHES

TURNRIGHT CONTROLS LTD., West Hill, Hoddesdon, Hertfordshire



Make COPPER go farther

You may not be able to get more copper at the moment, but you *can* get more from the copper you have. It's a case of 'more efficiency, less deficiency'. And the right material, in the right form, applied in the right way is something on which the CDA can give expert advice—as well as technical literature—free of charge or obligation. If you are concerned with copper or its alloys, in your own interest—

Consult the CDA

COPPER DEVELOPMENT ASSOCIATION KENDALS HALL · RADLETT · HERTS

SPECIAL

Cables

C.M.A. MEMBERS WERE THE FIRST WITH :

The Co-Axial Cable for Television

Multi-Circuit Cable and Couplers giving greater mobility for Television Cameras and Apparatus.

Specially designed Cables for use in X-Ray Apparatus.

Multi-Circuit Telephone Cables for Audio and Carrier Wave Trunk lines.

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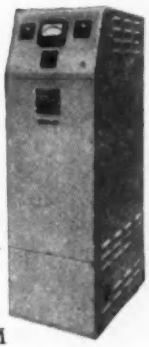
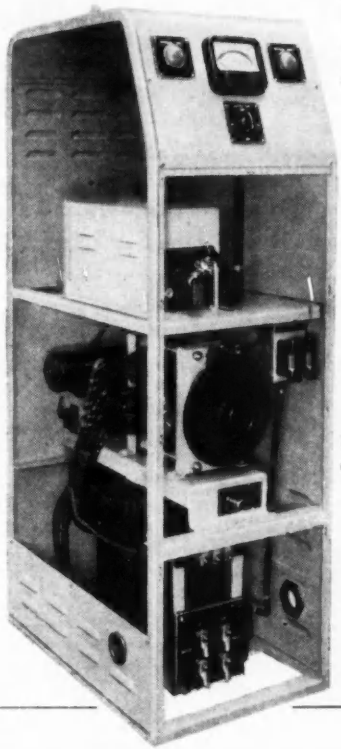
CABLE MAKERS ASSOCIATION

52/54 HIGH HOLBORN, LONDON, W.C.I. TELEPHONE: HOLBORN 7633

A case for VOLTAGE REGULATION



In this particular case a Model 12A38 type VR/CM Voltage Regulating Equipment has been fitted with an additional Voltmeter.



The equipment is one from our standard range of Automatic Voltage Regulators available for quick delivery.

Brief Specification

Supply

200 - 250v + 5% — 15% Single Phase. 50 cycles.

Output

Nominal supply voltage ± 0·5%
38 Amperes.

Full information of our range of automatic or hand operated single or three phase Voltage Regulators is available.

FOSTER
VOLTAGE REGULATORS

Write for List 4300

FOSTER TRANSFORMERS & SWITCHGEAR LTD

SOUTH WIMBLEDON · LONDON · S.W.19 · TELEPHONE: LIBERTY 2211

A 'Lancashire Dynamo' Company

9/12

C

IN HARMONY

The modern quest for beauty in everyday things demands that switches and similar fitments of a utilitarian character should blend with the general decorative scheme of the room in which they are fitted—an excellent reason why discerning contractors prefer to install Tenby switches.

Tenby Pilot

Tenby ELECTRICAL ACCESSORIES

Manufactured by

S. O. BOWKER LTD.

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CABLE MARKERS

Interlocking Type

The Critchley Interlocking Ferrule is a simple and economical solution to the problem of identifying cable ends where a wide range of markings is required

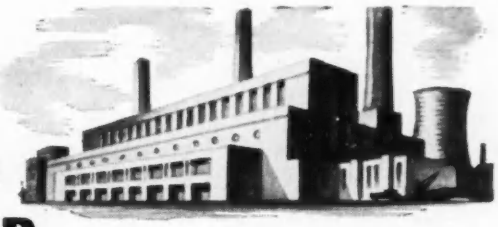
Leaflet on request

KEYED FOR PERMANENT ALIGNMENT

The patented key ensures that the ferrules can only be assembled with the figures in line and **CANNOT COME OUT OF ALIGNMENT AFTERWARDS.** Standard colours—Black, White, Red, Blue, Yellow and Green.

CRITCHLEY BROS LTD - BRIMSCOMBE - STROUD

Telephone Brimscombe 2208

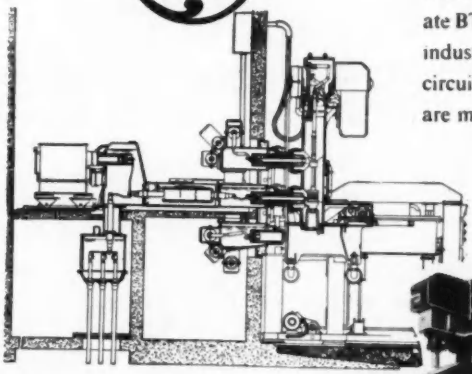


Central Station SWITCHGEAR

by

B T-H

Functional reliability of switchgear associated with the transmission of electric power is of paramount importance. Thus many of the world's largest electric supply systems incorporate BTH switchgear. All types from low voltage industrial distribution boards to the largest circuit-breakers for systems up to 300,000 volts are manufactured by BTH.



Cross-sectional drawing showing a typical duplicate busbar equipment.

1,000 MVA, 33 kV, class MF59 switchgear installed at the Ocker Hill Power Station of the BEA Midlands Division.

For all important installations
specify BTH switchgear

THE **BRITISH THOMSON-HOUSTON** CO. LTD., WILLESDEN, ENGLAND
Member of the AEI group of companies
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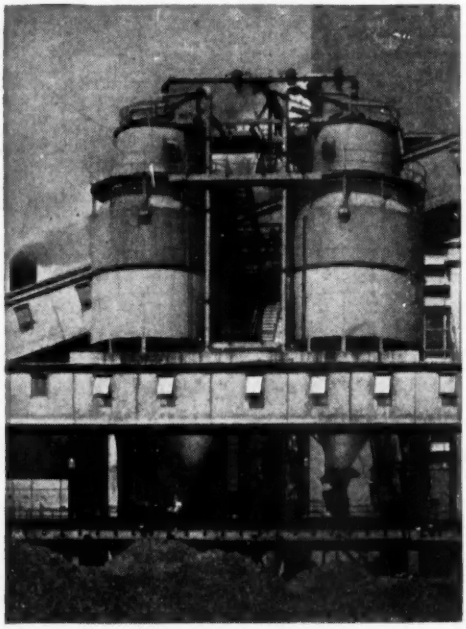
FLUE DUST AND RIDDLINGS

EXTRACTION PLANT



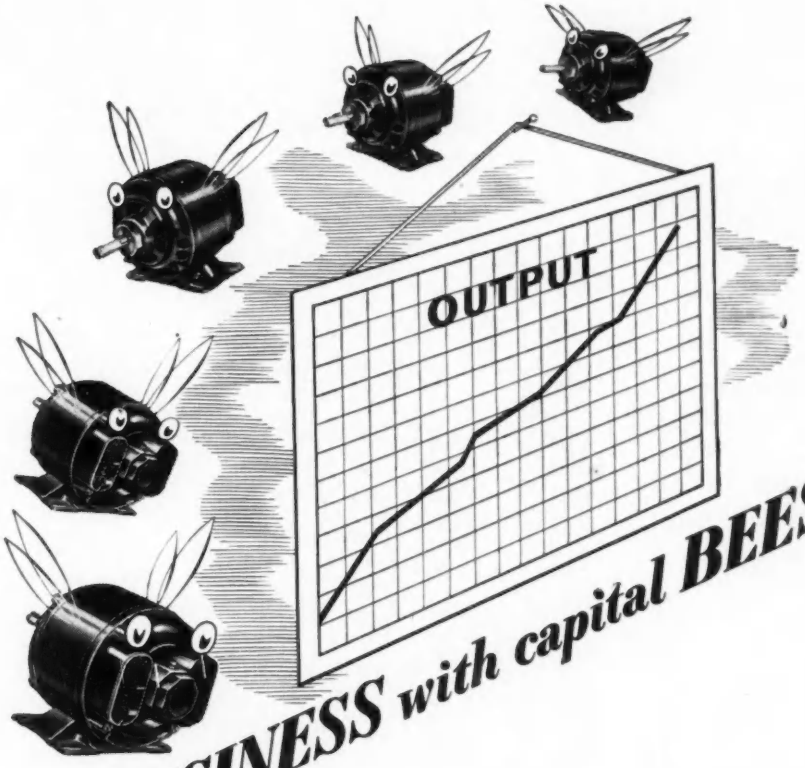
● The Nation's need demands that Coal shall convert every possible fraction of its energy into power for production. The vital contribution that efficient combustion makes to this end is immeasurably facilitated by B.V.C. Flue Dust Removal Plant. This is the recognised method of keeping steam boilers free from accumulations of flue dust, and ensuring that every ton of coal is used to the best possible advantage by removing and consuming the riddlings.

For Information and Consultation write to Dept. 14

B.V.C. INDUSTRIAL CONSTRUCTIONS LTD

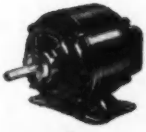
(Subsidiary of the British Vacuum Cleaner and Engineering Co., Ltd.)

Terminal House, 52 Grosvenor Gardens, London, S.W.1. Sloane 9975/P. Head Office: Leatherhead, Surrey



BIG BUSINESS with capital BEES

No matter what is being produced, output curves never sag when G.E.C. "Fractionals" are keeping the production lines moving.
All jobs come alike to these "skilled workers"—reliability is their strong point—"BEE of Service" is their motto.



G.E.C. "Fractionals"

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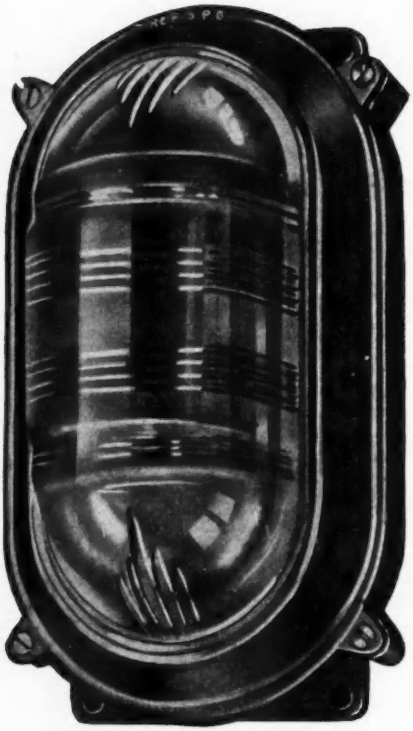

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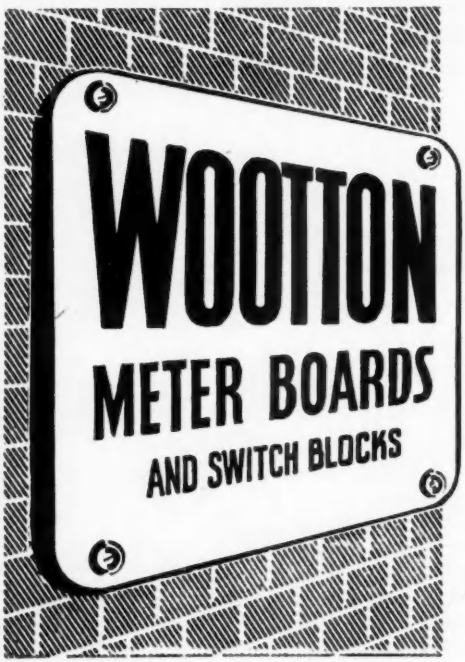

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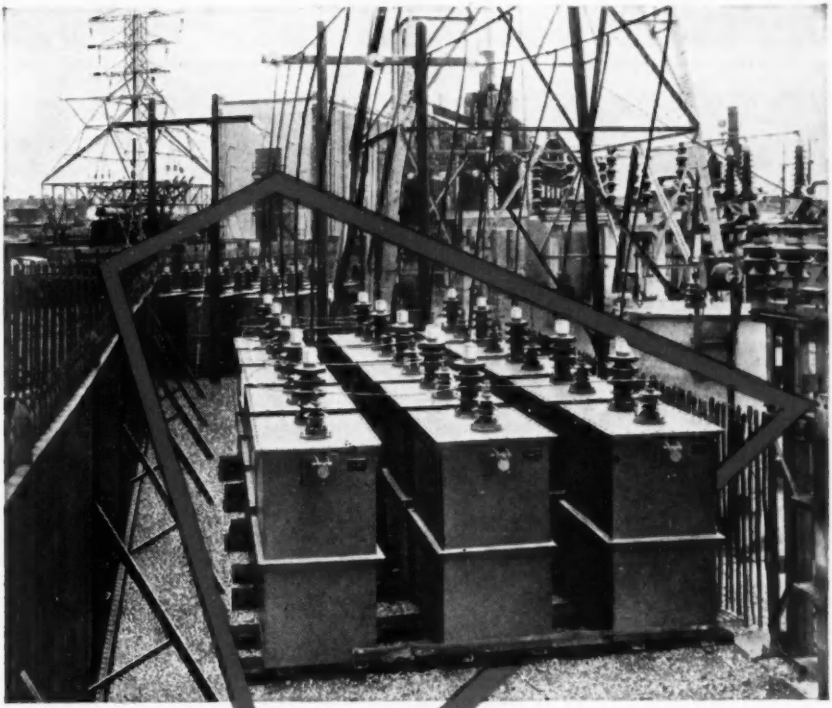

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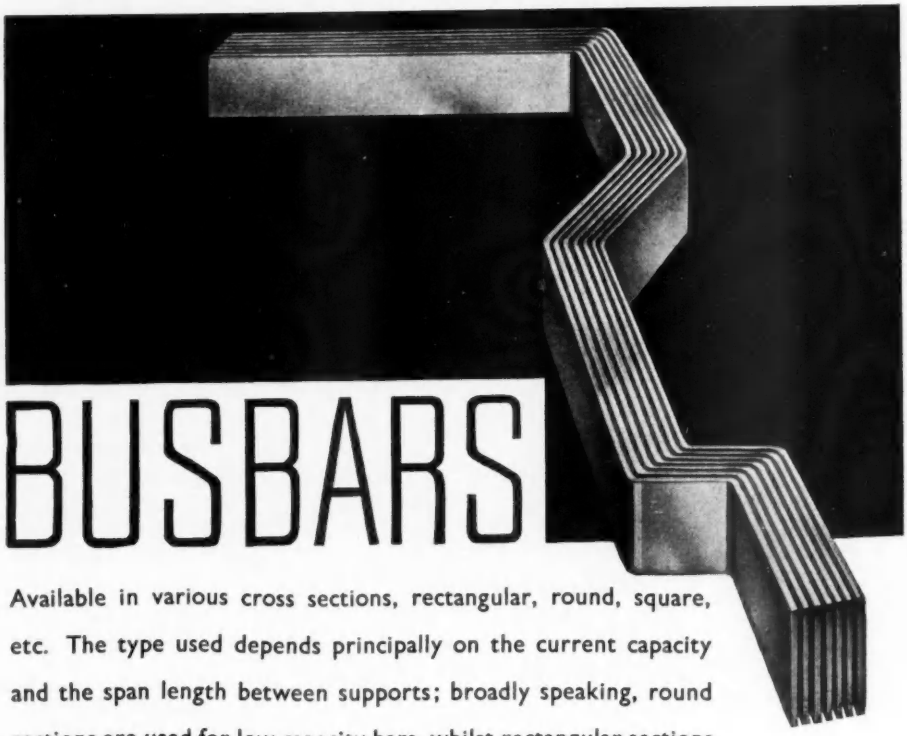

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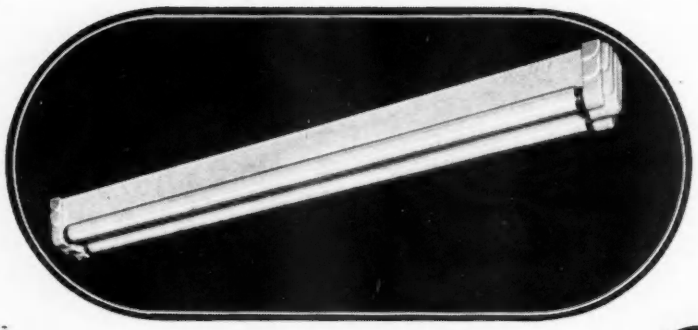

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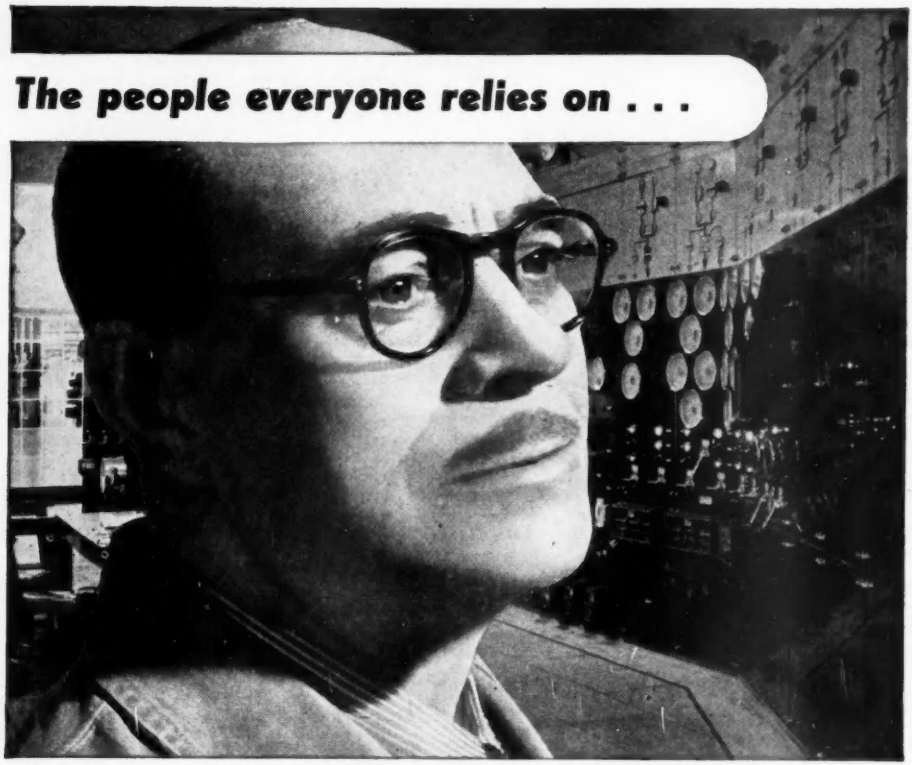

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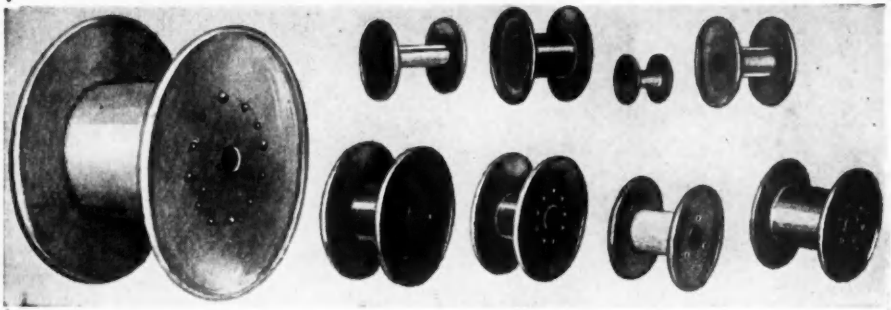

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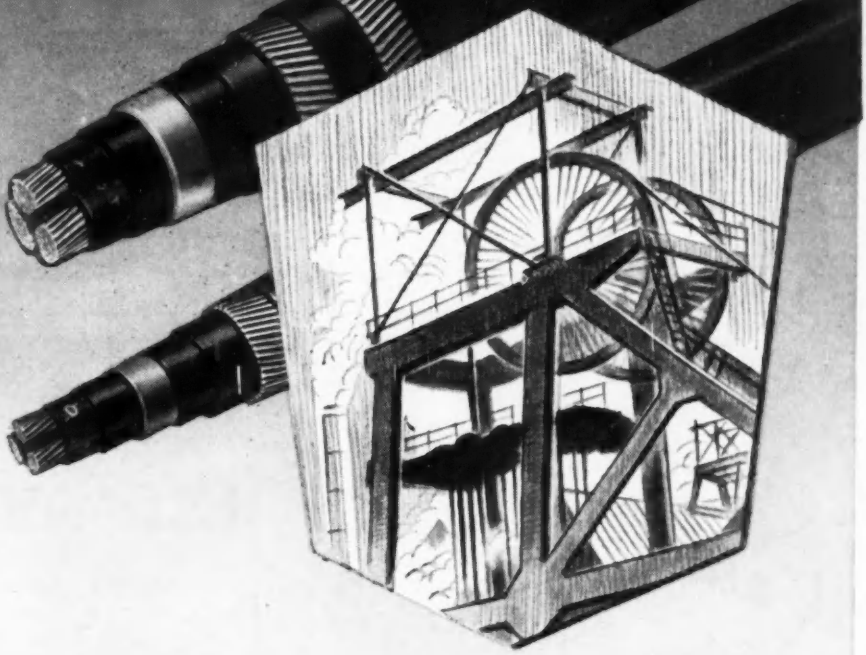

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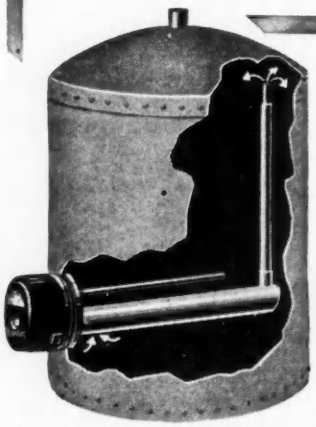

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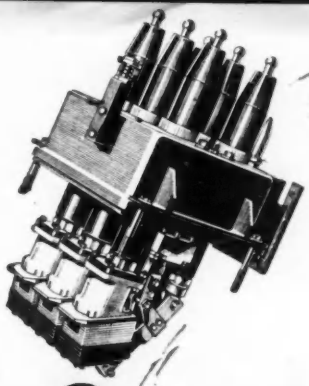

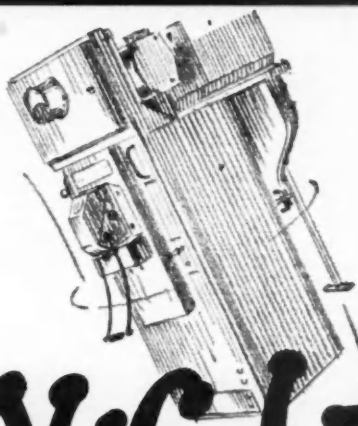

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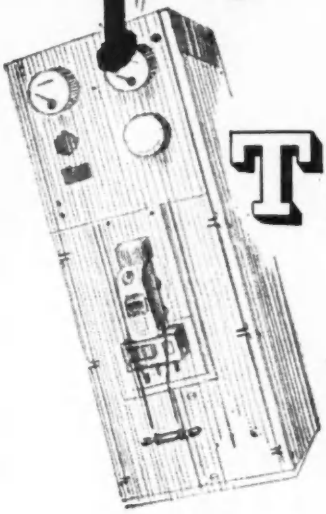

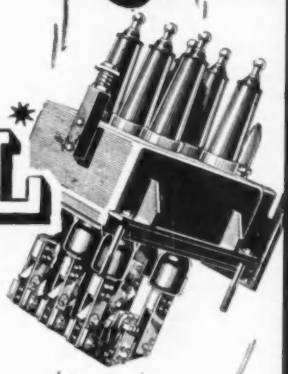

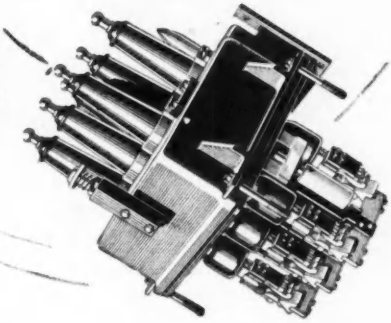

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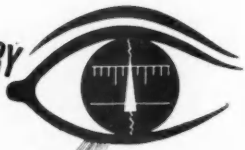

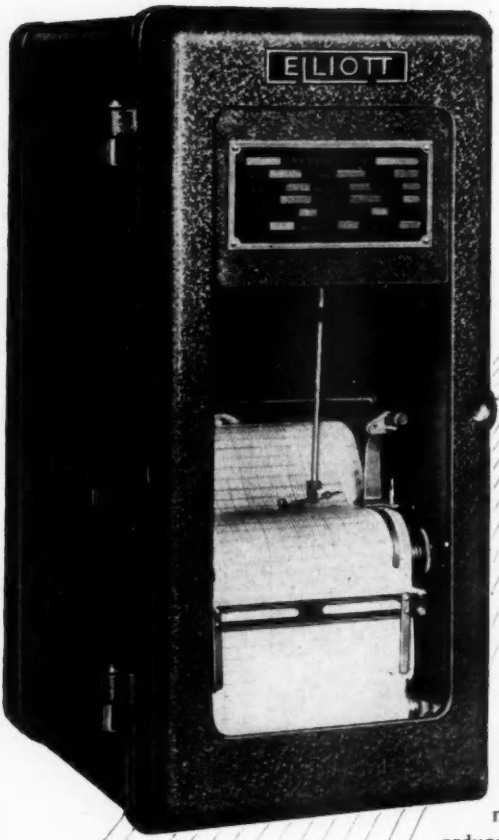

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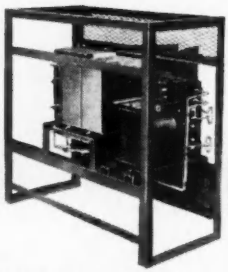

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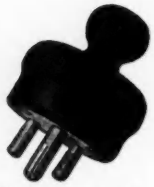

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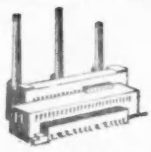

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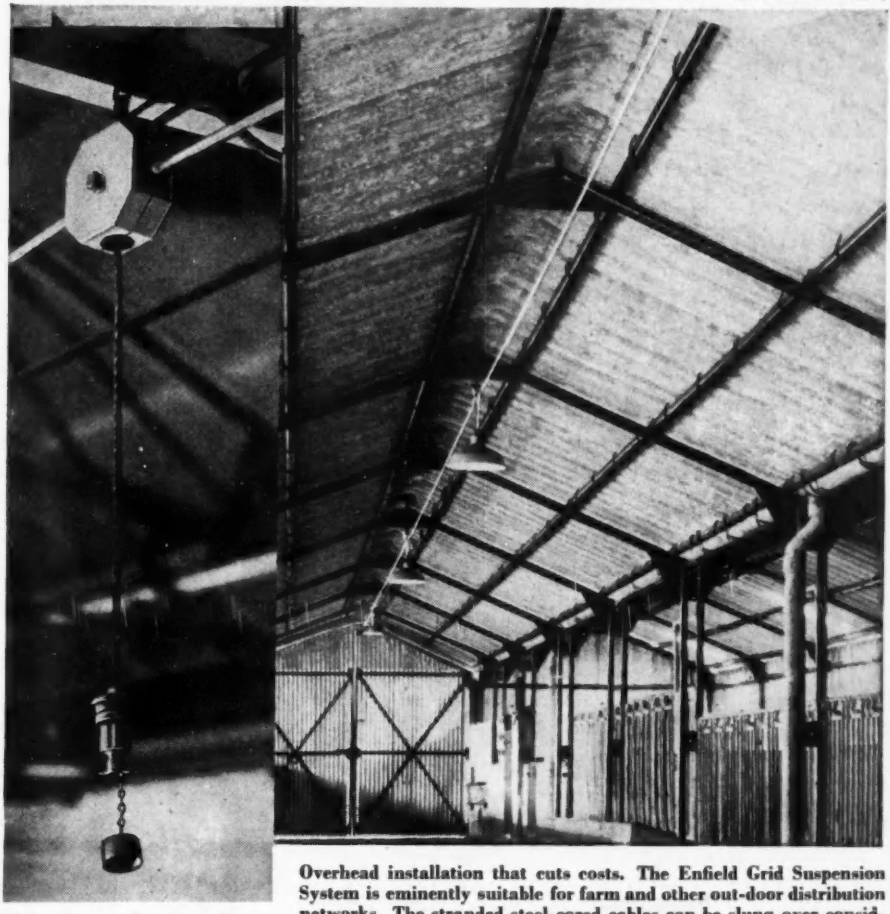

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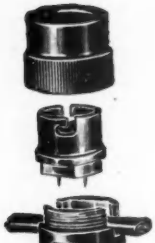

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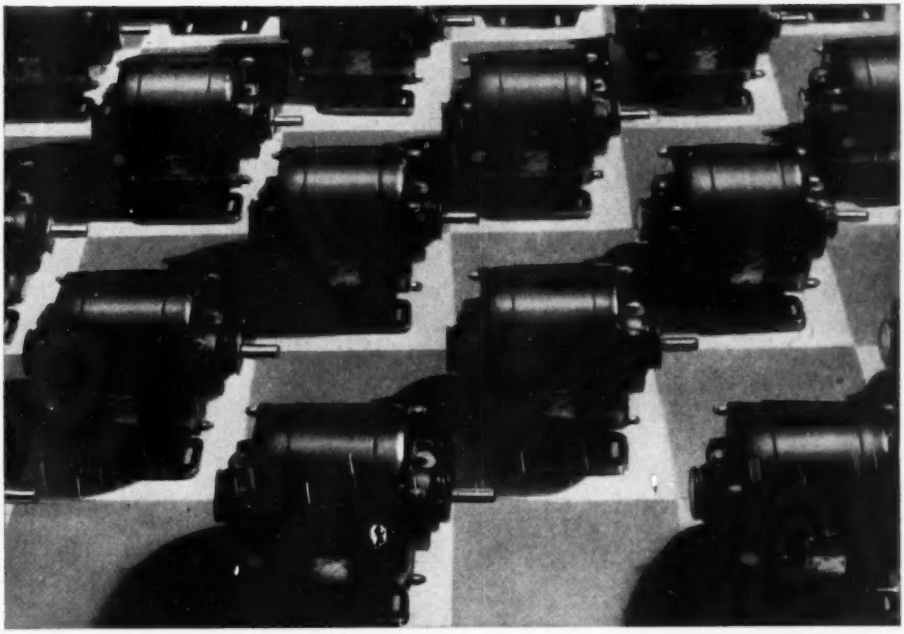

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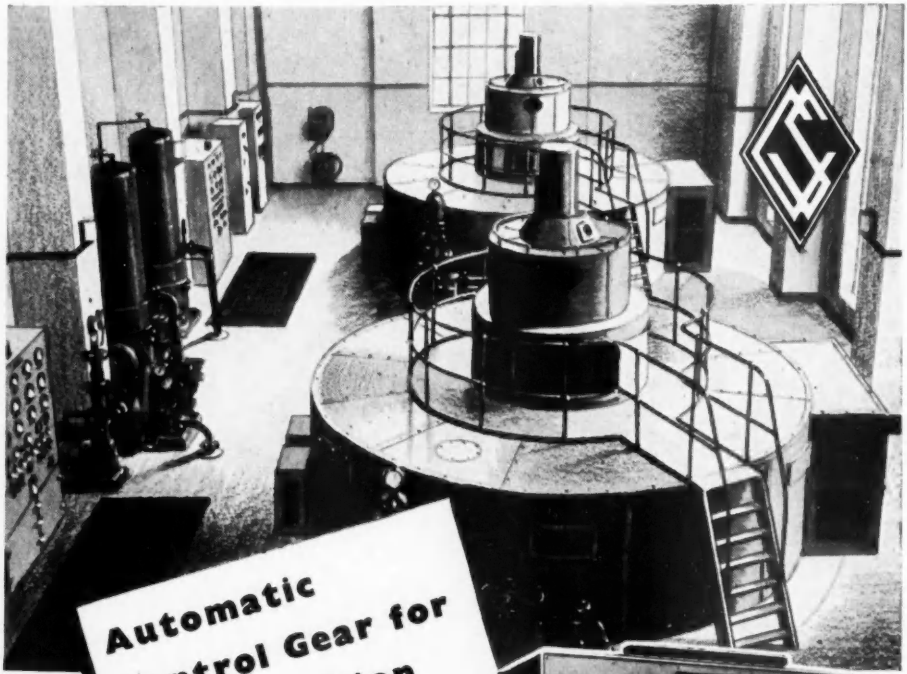

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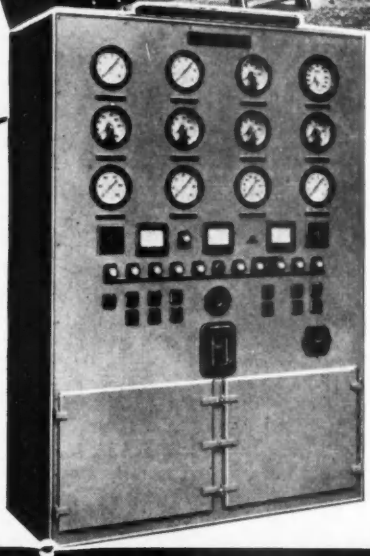

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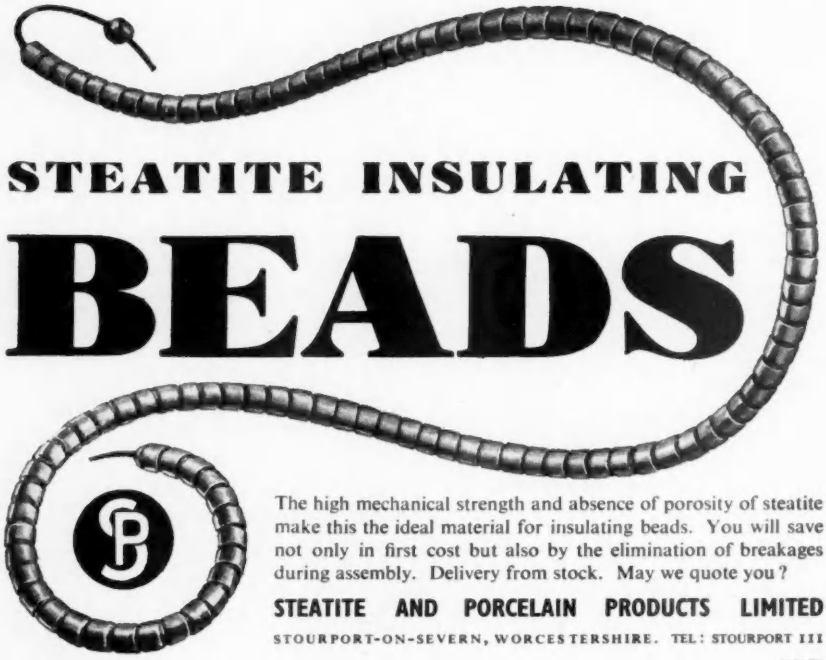

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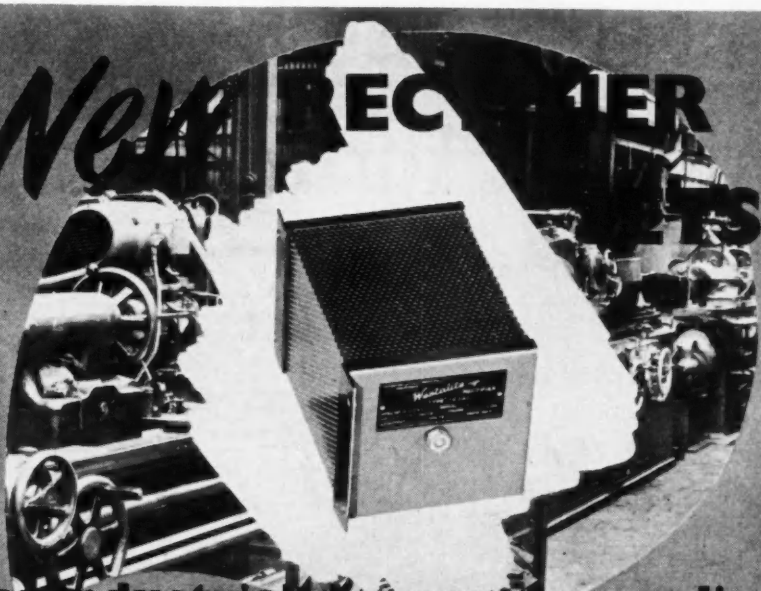

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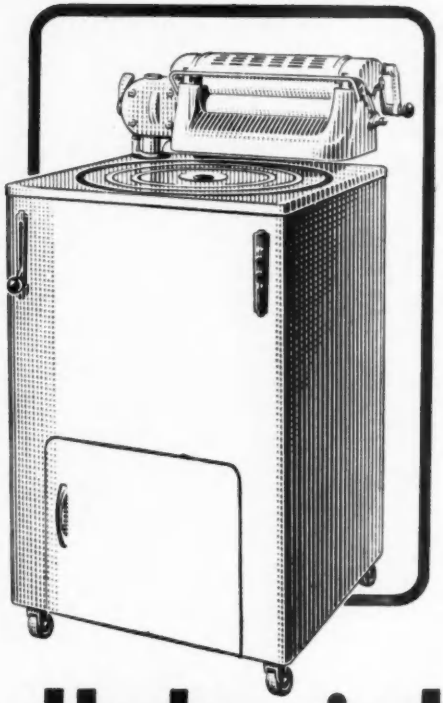

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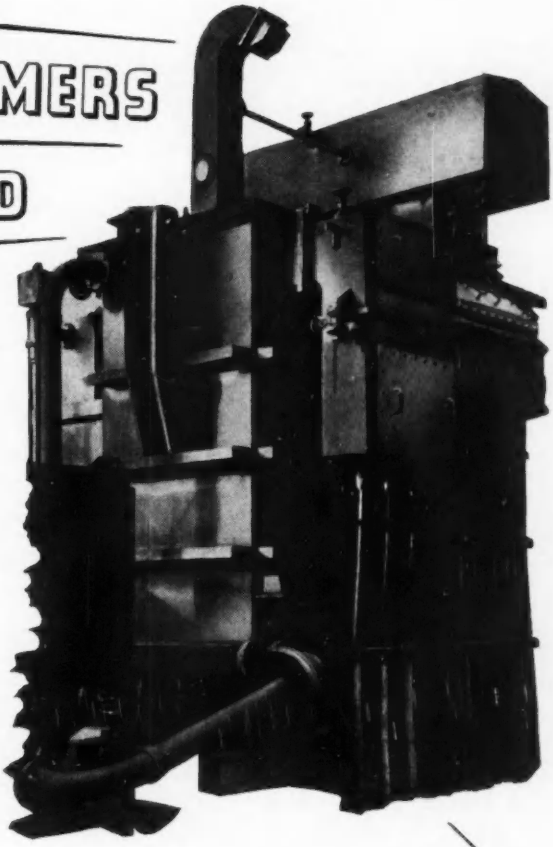

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ELECTRICAL TIMES

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Editorial

WHERE IS BRITAIN?

TECHNICAL agreement on the proposed linking of the British and French electrical systems, announced last week, has given emphasis to the question of why there is no British representation on the Committee on Electric Power of the United Nations Economic and Social Council. All of Western Europe is there, but not this country. Since the deliberations of this committee have been to a large extent concerned with the international problems of continental power supply, this country's interest may be limited, but their activities extend far beyond this. Rural electrification, supply tariffs, and the use of pass-out generating sets are but some of the problems raised, in which this country has a definite interest, while the proposed cross-channel cable now gives us an added stake in the whole of the discussions. The ill-effects of the absence of this country from this committee have already been manifest in the misunderstanding of our economic and technical problems shown in the United Nations' recently published report on the European Coal Problem, on which comment has already been made in this column. It is inconceivable that the views expressed in the report would have been made if proper advice from British delegates had been to hand. Our responsibilities are clear. The present is a time for international thinking, and this is already manifest on the purely technical side through C.I.G.R.E. and U.N.I.P.E.D.E. So, on the economic side, there must be a change of mind of those in authority in this country who set their face against such international co-operation. The United Kingdom must be represented at the level of discussions on electric power, just as it takes part in the wider conferences of the United Nations Organisation.

CREDIT IN QUESTION

ELECTRIC cooker sales have dropped in spite of this appliance being unaffected either by hire-purchase on credit restrictions, or by purchase tax. This was a point made by the Parliamentary Secretary to the Board of Trade, in reply to a recent suggestion that the Hire Purchase Control Order was responsible for the serious fall in sales of radio equipment and electrical appliances. But is Mr. Strauss correctly informed on this point? Overall sales of cookers have undoubtedly been restricted by the ceiling on area board capital expenditure that has affected promotional activity in respect of these appliances. Electric cookers are a bad example for another reason: sales are suffering severely from the effects of some years of anti-electrical propaganda, strengthened by the supply industry's plant difficulties. Happily, however, this instance of the cooker is not being used to support an inflexible official case. The Government is prepared to discuss with trade associations cases where hire-purchase restrictions may be hitting an industry more severely than was intended. A B.R.E.M.A. deputation is the first on the list, and the degree of success they achieve will be watched eagerly by other electrical retailers and manufacturers, for although all have been hit by these limitations, it seems that only when the unemployment shoe begins to pinch does the Government start to take notice.

THE GAP NARROWS

LAST week's report on load-spreading policy for next winter showed that there are some hidden advantages in the fall in load growth being experienced by the Area Boards. Because demand has not increased at the "normal" rate and the new

plant programme is well up to schedule, it is considered that a "safe" winter can be achieved with only a 10% cut in industrial peak-period demand. Compared with the 20% asked for last winter, this has the important advantage of being realisable largely by means other than large-scale staggering of working hours. It is estimated that the gap between output capacity and potential peak demand in an average cold spell will have fallen to about 1,500 MW by December, an improvement of 900 MW on last year, to which the loss of expected load growth is estimated to have contributed 700 MW. In effect, therefore, about seven months has been gained on the commissioning programme. This must have a considerable value for industry as a whole, but for the B.E.A. it throws into relief another problem. As more divisions become self-sufficient in plant, the lack of available transmission capacity will prevent this being used to supplement shortages remaining elsewhere. Such difficulties are already being experienced in some cases, but without adequate grid reinforcement they will become progressively worse. This limitation is undoubtedly what Lord Citrine had in mind in his speech at Bournemouth, when he emphasised the importance of commissioning sections of the 275 kV system strictly to schedule in the next three years.

PHOTOGRAPHING AMENITIES

WHAT exactly is an amenity and how is it destroyed? While a precise definition may present some difficulty, at least there is room for a more concrete understanding than the loose approach that is so often apparent in the arguments of those who oppose change of any sort. Nowhere is this looseness more apparent than in the use of photographs as evidence. We do not here mean the retouching of prints to falsify values but the deliberate selection of a camera viewpoint in order to give emphasis to the particular arguments it is desired to put forward. This is unfortunately too easy, particularly with the strong perspective which the popular short focus lens gives. When, as so often happens, a prospective overhead line has to be painted in on the photograph to give an assessment of either its unsightliness or obscurity, the scope for artistic licence is unlimited. While it is hardly possible to recommend the drawing up of a specification for British Standard photographic viewpoints, at least it should be recognised that only photographs taken from specific well-known beauty viewpoints are admissible and that in no case should the exposure be made within a specified distance of an overhead line, so as to prevent exaggerated emphasis. This should leave both parties reasonable room for manoeuvre in producing the particular illustrations they are seeking, but it might avoid the extremes of photographic distortion which are produced under the label of evidence.

IDEAS ON WIRING

RECENT references to the work of the Wiring Regulations Committee of the I.E.E. have indicated that the committee is proceeding with its task of preparing a new edition of the wiring rules. The wide basis of representation on this committee ensures that most responsible points of view are considered in its deliberations, but there is perhaps room for a deeper sounding of the Institution's general membership for ideas on possible modifications to the 12th edition. Another matter which is worthy of investigation is the value of the simplified version of the regulations, published a few months ago. Discussions at Institution meetings, whether formal or informal, usually produce some worthwhile ideas, and this is especially likely with a subject such as installation engineering, where practical experience counts for so much. It might well be of assistance to the Regulations Committee, and of value to the industry as a whole, if those now planning the I.E.E. programme for the next half-session could include such discussions both at headquarters and at local centres.

Meteor

ELECTRICAL EQUIPMENT *for MACHINE TOOLS*

Design Features Aim at Service over Long Periods with Minimum Maintenance

By J. C. JONES, M.I.E.E., A.M.I.Mech.E.

THE importance of this subject has been greatly increased due to the need for industrial expansion in this country. The demand for still higher productivity is two-fold in that our own requirements for machine tools are coupled with the vital necessity of increasing our exports. The large number of machines now being supplied abroad is evidence of the efforts which are being made by British makers to cope with a world-wide demand for greater and more efficient manufacturing facilities.

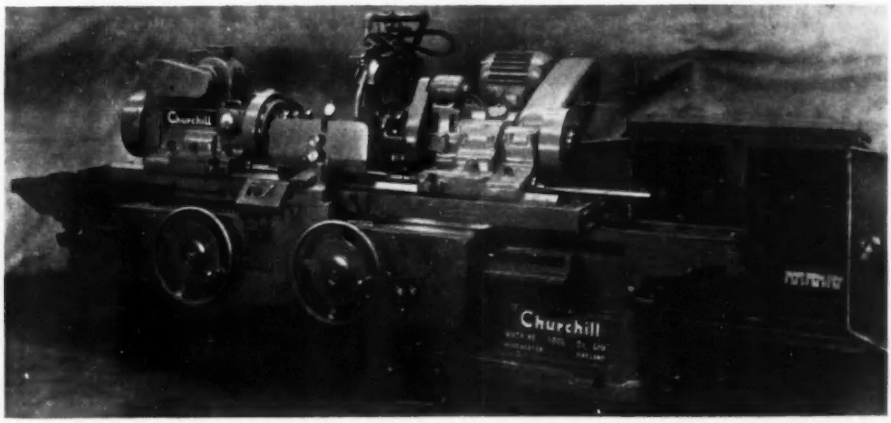
The well designed, reliable and accurate machine tool is one of the essential requirements of an up-to-date manufacturing plant and it is, therefore, of the highest importance that the electrical equipment with which it is fitted should give good service over long periods with the minimum of maintenance. From this it is obvious that when electrical maintenance is required it should be easy to carry out quickly and with safety.

Machine Development

In the past there has been much criticism of the way in which electrical equipment has been incorporated in machine tools, but it should be remembered that the machine tool went through an evolutionary process of development. The early machines were mainly conceived as driven by belts from a lineshaft, and later when electrical distribution in factories was found o have many advantages in workshop layout, the obvious step was to provide an individual motor on the floor or in the roof to drive the machine countershaft. This involved practically no change in machine design. About this time, however, consideration was being given to increasing the versatility of machines and it was realised that, if individual sections could be electrically driven and controlled, alternative features could be offered on the same basic machine, thereby extending its usefulness. The power supply to movable parts of the machine was also simplified.

Machin tool makers however found it difficult to convey to electrical manufacturers a comprehensive outline of requirements in so far as they affected electrical design. A number of leading makers therefore now employ their own electrical engineering staff who are able to obtain first-hand experience of the design problems involved and of actual work-

Fig. 1. This Churchill 14 in. x 36 in. crankshaft pin grinding machine has electric and hydraulic controls



ing conditions. Where the problems associated with electrical equipment are considered at the design stage, most of the early objections can be said to have been overcome.

This historical outline will explain why the design of some of the early electrically driven machine tools left a good deal to be desired, both from an operating and maintenance point of view. In spite of this, however, it must be agreed that rates of production, accuracy of the finished product, and ease of operation have greatly improved in recent years and latterly users have laid considerable emphasis on streamlining and general neatness of appearance. The latter considerations have, in some cases, caused designs to be produced in which the electrical equipment is given insufficient space or is much too inaccessible for easy maintenance. A great deal of attention is at present being given to improving the electrical layout of the machines and it is likely that there will be exhibits showing the result of this work at the International Machine Tool Exhibition, 1952, which takes place at Olympia, London, in September next.

Quality

There are of course variations in the quality of machine tools as in most other manufactured articles and whilst it is important to avoid increasing capital costs unnecessarily the provision of thoroughly sound electrical equipment is certainly justified. Generally its cost is a relatively small proportion of the total cost of the machine.

In these days when so many machine tools are electrically operated and controlled it is not sufficiently realised that the machine can only be as reliable as its electrical apparatus. The best mechanical designs will be useless if the electrically driven motions and controls are not of an equally high standard.

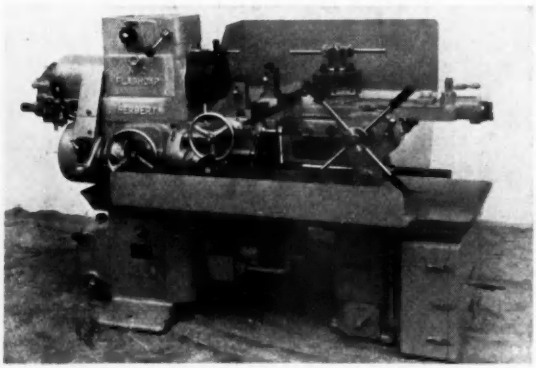
The following comments are intended to indicate what is considered to be good practice in regard to electrical equipment and wiring, and if followed will avoid the complaints so often voiced by maintenance engineers.

Choice of Motors

Where alternating current only is required for the machine drive the squirrel cage motor is of course the most widely used, on account of its simplicity. It may be of the foot, flange mounted, or stator and rotor type, the latter having great advantages where the cutting tool can be mounted direct on the rotor shaft. Except where extremely heavy duty is a feature of the particular drive, such as frequent reversals, braking by reverse plugging or other means, necessitating the dissipation of considerable heat losses, all machine tool motors should be of the totally enclosed or totally enclosed fan-cooled type. Experience shows that the atmosphere in the average machine shop carries fine metallic dust in suspension and since coolant is a common feature of many metal working machines, there is also oil and water vapour present. This mixture is drawn by the ventilating fan on to the windings and on to the rotor in a protected type motor. Many coolants contain dissolved chemicals or soluble oil and the final result after a few months running is the accumulation of a sticky substance which adheres to the windings and collects in the air gap. It is not uncommon for the metallic dust particles to percolate through the insulation after a period of time due to the magnetic field and this, in combination with the general dampness and condensation occurring when the motor is at rest, eventually causes insulation breakdown. Further, the collection of condensed oil and dust, metallic or otherwise, on the periphery of the rotor often causes it to seize up in the stator bore. It is true that windings can now be impregnated to resist the effects of oil, but there is no doubt that if total enclosure is used, maintenance is unlikely to exceed the very occasional greasing of ball bearings and the cleaning of the external fan openings.

It has often been stated that totally enclosed motors are too big for convenient mounting on machine tools, but in the frac-

Fig. 2. A totally enclosed motor rated at 3 h.p. and designed for 30 reversals/min drives this lathe. Forced air cooling is employed



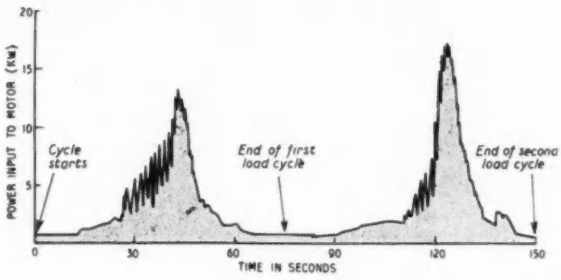


Fig. 3. Duty cycle for a crankshaft grinding machine mentioned in text. This, it was found, could be driven by a machine of frame size equivalent to 7·5 h.p. although the peak input was 17·5 kW

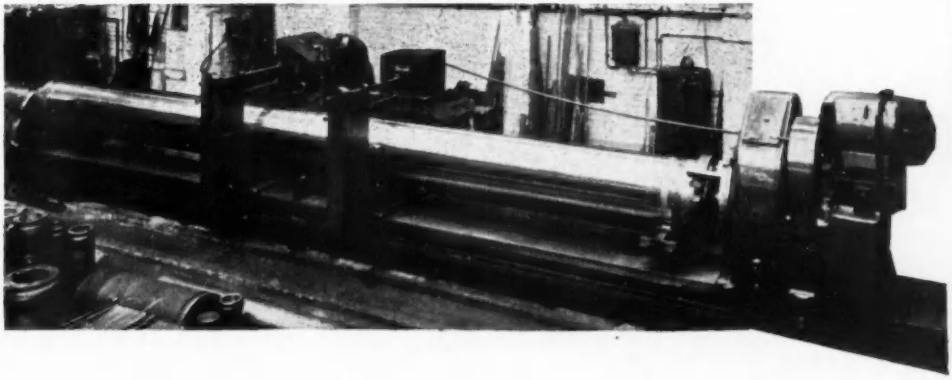
tional horsepower sizes many manufacturers now offer the same frame size whichever enclosure is used. Larger motors, whether of the totally enclosed or protected type, can be obtained with the same essential fixing dimensions and shaft size from some manufacturers so that the fixing centres are the same. It sometimes happens, however, that the additional overall length due to the external cooling fan, can be inconvenient, as can the air draught from the fan, should the position of the machine operator happen to be in line with it. In such cases the frame size and weight can be kept much the same as for protected type motors by rating them on a short time continuous light running, or r.m.s. basis and omitting the external fan.

As an indication in the reduction in size, which can be obtained by this method, the case may be mentioned of a motor, driving the grinding wheel of a production crankshaft grinding machine this being typical of many machine tool drives. The estimated power required was 15 b.h.p., and if a continuously rated totally enclosed fan cooled motor were used, its weight would have been 644 lb. The duty cycle curve of this particular drive is shown in Fig. 3, and if the motor were rated on a short-time r.m.s. basis from this curve, with the knowledge that the peak power input demanded by the machine is 17·5 kW, the frame size (but not the electrical design) would be the same as that of a $7\frac{1}{2}$ h.p., continuously rated motor of the same make and its weight would have been 458 lb. The equivalent 15 h.p., continuously rated protected type would weigh 462 lb. It will thus be seen that the weight of an intermittently rated totally enclosed motor is almost identical with that of a continuously rated one of the protected type and this example is typical of many machine tool applications.

Weight Saving

The saving of weight is an important factor in machine tool design, because apart from dimensional considerations, the balanced distribution of weight and pressure on machine tool slides, has to be kept within certain limits in order to preserve the sensitive and accurate movement of the various sections of the machine. From power input tests on previously constructed machines of a similar type, it is usually possible to obtain a duty cycle such as

Fig. 4. Feature of this roll grinding machine is the built-in desk control equipment mounted on a moving carriage seen at the back, which facilitates close working by the operator



that illustrated and much economy in material could be achieved were this practice more generally followed. It must be emphasised, however, that these tests must be made under the heaviest working conditions which can occur in use, before deciding on the rating of the motor to be used.

It is, of course, a feature of motors designed in this way that they have a temperature rise more nearly approaching the maximum of 50° C, permitted under BS.168:1936, than would be the case were they continuously rated. This sometimes give rise to unnecessary misgivings in the minds of maintenance engineers.

Power Factor

It should also be remembered that the no-load current and the no-load loss of squirrel cage motors is, in general, proportional to the horsepower rating. From the factory electrical supply point of view, therefore, a better overall power factor and efficiency will result to the machine tool user from the adoption of these short-time rated continuous light running motors wherever possible. The increased cost of totally enclosed motors is sometimes used as an argument against their use, but in general, the difference in cost between the two types mentioned is only of the order of 10 per cent. This additional first cost is certainly justified on grounds of reduced maintenance charges.

Where it is inadvisable to use totally enclosed motors owing to inherent electrical design limitations, adequate precautions must, of course, be taken to protect the motor by fitting splash guards which will not restrict ventilation unduly. On larger sizes of motors, pipe ventilation can often be used with advantage from a maintenance point of view, the ventilating ducting being arranged with the air intake at a point clear of moisture or dust.

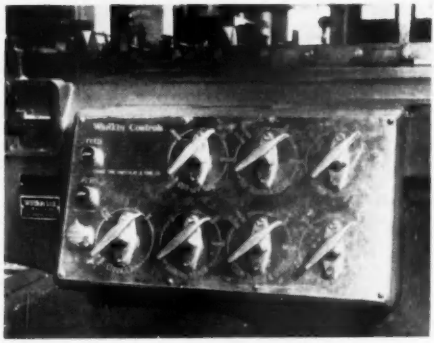


Fig. 5. These rotary switch controls are used on one design of woodworking machine

Control Equipment

In deciding the best type of starting equipment to use for a particular machine, the main consideration should be the duty which the machining process will demand of it. In simple cases where the drive is by a single motor it is probable that the starter will only be operated once per shift and a hand-operated starter may suffice. On the other hand in the case of automatic multimotor and special purpose machines one or more of the drives may start and stop up to 200, or even 300 times per hour in extreme cases. The question of mechanical wear on contactors and relays must, therefore, be taken into account as must ease of maintenance. By no means all contactors on the market at the present time will give satisfactory service under such conditions.

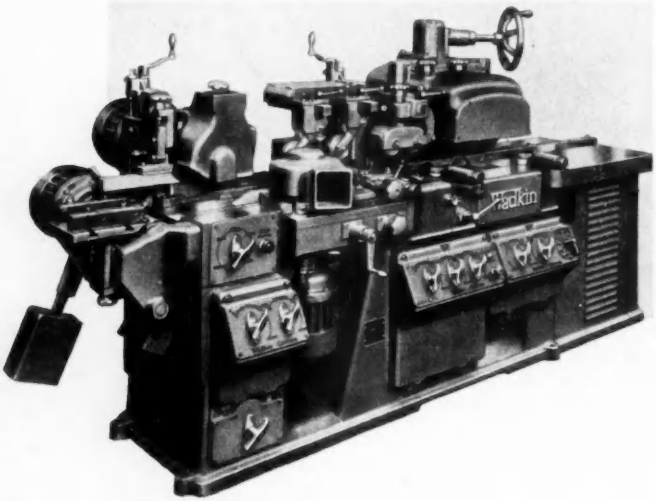


Fig. 6. In this moulder, stator/rotor units with cutters mounted on the spindles are used and there is a neat arrangement of rotary switch controls

Where the supply is 3-phase a.c. it is desirable to use direct-starting wherever possible, thereby keeping the control gear simple. The recommendations contained in the BEAMA booklet entitled "Alternating Current Motors on Public Supply Mains (Starting Conditions)" are a useful guide in this connection and will avoid difficulties with the electricity supply undertaking if the machine is to be installed in this country. The requirements of foreign markets in regard to electrical equipment have also to be borne in mind.

In view of the variation in the standstill current of different makes of motors and the fact that they vary with different rated speeds, it is necessary to make sure that the contactors installed will deal with them adequately, particularly where frequent duty is involved. Multi-step starting should be avoided as far as possible as it necessarily introduces a larger number of operating components.

The question of the mounting of control gear is one which has aroused considerable discussion. It can be either built in, attached to the machine externally or provided in a separate floor-mounting cubicle. When a change in production requirements necessitates the transfer of machines to new positions it is an advantage for the machine and all its electrical gear to be a single unit and this arrangement is preferred by many large users, particularly in the automobile industry. The only electrical work then involved in moving machines is disconnection and reconnection of the incoming supply and considerable time is thereby saved.

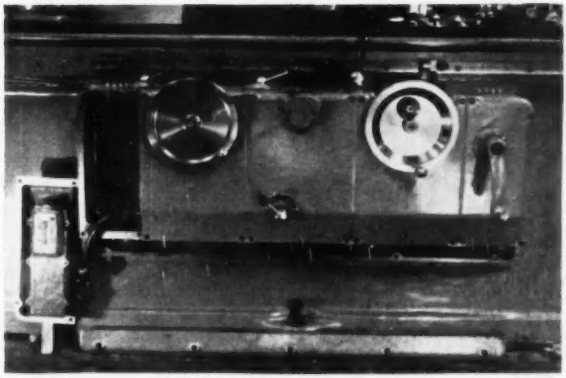


Fig. 7. This view of the front apron of a cylindrical grinding machine clearly shows the wiring duct

Machine Shape

It is not always appreciated by maintenance engineers that the general shape of a particular machine tool is determined by the type of component to be machined and the machining process to be carried out on it. This necessarily limits the positions available for building in control gear. A most important consideration in the design of machine tools is rigidity in the main body casting and the provision of large cored holes for accommodating control gear, in addition to those which are essential for mechanical reasons, is not always desirable.

It is usually possible, however, by co-operation between the mechanical and electrical designer to achieve a satisfactory arrangement but one important requirement must be met. It is vital that the cavity provided for built-in contactor equipment (as distinct from the controls) should be completely separate from the other sections of the machine, such as oil tanks, pumps or other mechanical gear. A further desirable feature is that the cavity should be a a convenient height above floor level.

Mounting Equipment

The mounting of the equipment on the back of a hinged cover is satisfactory provided that adequate clearances to earth are allowed and its operation can be observed with the cover open. When it is more elaborate it can be assembled on a draw-out type framework having a sufficient length of cable including an earth continuity conductor protected by insulating sleeving to allow it to be removed from the machine for maintenance. This arrangement, if well designed, has the advantage that the operation of the contactors and relays can be observed and adjustments easily made by electrical personnel with the unit removed from the machine. It is essential that the control gear covers should bolt up to machined faces or have well-gasketed lids to exclude dirt.

The second method of attaching the contactor gear externally has much to commend it from a maintenance viewpoint although it may detract from the general appearance of the machine. The disposition of electrical components inside a sheet metal or cast enclosure can often be arranged so as to give a shape convenient for external mounting at the same time allowing easy access. An extension of the same idea is to mount the enclosure on suitably hinged brackets so that it can be moved and locked in a position most suitable to the

operator, pushbuttons or control switches being conveniently mounted on it.

Where the control gear is mounted separately using the third method all the wiring should be brought out to a terminal box at a convenient point on the machine and properly labelled to correspond with the control panel wiring. Reconnection on site can then be easily and quickly made.

Control

As regards the electrical specification, it is desirable that equipments having more than one contactor or having remote control, should be provided with control circuit fuses to give protection to the external control circuits. On more complicated control schemes there is much to be said in favour of 110 V control circuits supplied from a double-wound transformer having the mid-point of the secondary earthed. This enables heavier section and more robust wire to be used on contactor coil windings and reduces the danger of shock to the operator.

It is sometimes found advantageous to include an emergency stop push-button to stop all motors, although this method does not always give the protection against accident which is sometimes claimed for it. The reason for this is that it may be important from a safety angle to move one portion of a machine clear of another quickly in order to avoid danger to the operator. Where this can only be done if electrical or hydraulic power is available for a particular drive, a common emergency stop push-button is undesirable. In such cases the emergency stop push-button should only be associated with the drive or drives where it is effective.

It is a Factory Act requirement that there should be provision on each machine for cutting off power in order to prevent danger and each machine tool should therefore be provided with its own isolating switch and fuses which should be interlocked with the cover containing the control gear. Where this is not possible a warning notice should be provided on control gear covers stating that isolation is necessary before opening up and a separate isolating switch with fuses provided at a convenient point. Proper provision for isolation should be made on all machine tools and it should not be left to the user to fit an isolating switch on installation.

The question of protecting individual motor circuits on multimotor machines where overload protection is provided for each motor, is one which deserves some consideration. The I.E.E. Regulations for the Electrical Equipment for Buildings gives recommendations on the fusing of sub-circuits on a building distribution system, but are not intended to cover the protection of internal electrical circuits of a composite electrically controlled unit such as machine tool. In such a case the overload trips provided in the motor sub-circuits do, of course, provide excess current, but not short-circuit protection for their conductors. In general, the expense of providing h.r.c. fuses in addition for each sub-circuit is certainly not justified, particularly where the practice mentioned earlier is followed of providing an isolating switch with fuse at the point where the supply enters the machine. There are cases, however, where the main motor on a large machine tool has a rating very much greater than that of its auxiliary motors. It is usual for such a machine to have a single incoming supply connected to a contactor panel and it is then considered desirable to feed these small motors from a set of group fuses incorporated in the control gear. If the main motor represents say, 70 to 80 per cent. of the total input to the machine, the incoming distribution fuses provide adequate short-circuit protection for the wiring of the large motor. As these large machines are usually of the special purpose type it is difficult to generalise and each case should be considered in relation to the size and number of motors involved.

Position of Controls

The mounting of control devices and their design for machine tool use deserves particular attention in view of the frequent duty to which they are often subjected. As already mentioned, coolant spray or metal dust is present on many metal working machines and the operator's hands are often wet when he operates a control device before removing a component from his machine. Moisture from the hand running down push-button stems has often lead to insulation troubles and in this respect porcelain pushbutton assemblies have much to commend them apart from their comparative brittleness. Push-buttons are now available in which the push itself is separated from the contact parts by a flexible oil-resisting gasket which effectively seals live parts from moisture entering from the front. Where these push-buttons are built into the machine covers, however, at the back of which there is mechanical gear or oil vapour from a hydraulic system, it is desirable to provide protection at the back by suitable covers. The wiring should be brought to the terminals through properly glanded and supported metallic or wire rein-

forced flexible tubing. As an alternative to push-button operation it is often convenient to use rotary or semi-rotary switches operated by means of a lever similar to the conventional machine tool type, and example of which is shown in Fig. 5. The handle of the operating lever can then often be brought to a more convenient position than would be the case if pushbuttons were used and is more convenient for frequent use. Where control switches of the "on-off" tumbler type are used these should have metal rather than plastic operating levers which are so easily broken and which operate through a slot in the cover through which moisture can enter.

A word concerning the location of these control devices may not be out of place. Although there may be a number of these there are probably only one or two which the machine operator uses frequently and their position on the machine is determined by ease of operation. As far as the remaining controls are concerned these should all be mounted together in one position on the machine so that maintenance only involves the removal of one set of covers.

Limit switches controlling the operation of different sections of machine tools should be of robust mechanical construction and damp and dustproof. The number of moving parts in the switch should be the minimum possible in order to reduce wear. Certain types of switch embodying several over-centre quick make and break coil springs are prone to heavy wear and tear on frequent duty and their adoption should be avoided wherever possible. Where the switch is operated from moving parts of a machine the simplest form of switch is usually the best. One very simple type has been designed in which the contacts are held in the closed position by a simple compression spring with a small compression ratio and this is its normal condition when the machine is running. As soon as the machine moves to its rest position the switch is opened by a suitably placed operating dog, shaped so as to give a quick break. During the operating cycle of the machine no wear then can take place as the dog is not in contact with the switch lever. A point often overlooked by switch makers is that the conventional over-centre type of quick make and break device subjects the mechanism to violent shocks. Failure eventually occurs due to fatigue of the material of which the spring is made or to wear of the cams which are often associated with them.

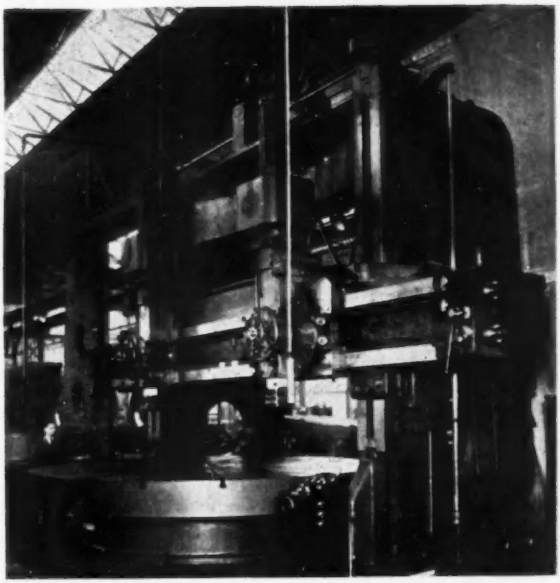


Fig. 8. Desk and pendant controls are provided for this 14 ft vertical boring and turning mill

Wiring

There has been a great deal of trouble on machine tool wiring in the past due both to unsuitability of the cable insulation and conduit fittings in the dusty and oily conditions which prevail. It is therefore surprising that many official specifications still call for v.r. insulated cable of a voltage grade higher than is necessary on 400/440 volts 3 phase supply with earthed neutral, presumably using the argument that the increased thickness of insulation will give added protection. This, however, is not the case as rubber insulation deteriorates rapidly if subject to oil or coolant and swells so that sometimes it cannot be drawn out of its conduit when replacement is necessary. The elimination of v.r. insulated cables and the substitution of the p.v.c. insulated type has removed practically all wiring troubles.

Examination of machines wired in p.v.c. cable after ten years use shows no appreciable deterioration. P.V.C. cables can be obtained in many colours, and this is very helpful in carry-

ing out wiring and in tracing faults if a rigid colour code is adopted based on the complete machine diagram. It is, of course, important that p.v.c. cable should not be used in situations where the temperature of that portion of the machine to which it is attached is likely to reach 115° F, at which temperature the insulation softens. There are, however, comparatively few types of machine tools where this is likely.

Where there is no relative movement between the machine and the motors the wiring should be carried out in either solid drawn or good quality welded conduit. In view of the short runs which normally occur there is little need for inspection fittings which can be a source of trouble unless the cover joints are machined or fitted with gaskets. The provision of suitable ducts in the machine structure for carrying wiring considerably improves the general appearance and is not as difficult to carry out as might at first appear. An example of this practice is shown in Fig. 7, from which it will be seen that wiring can be inspected on the removal of one cover which is shown resting on the floor. This illustration also shows the internal covers over control devices referred to in an earlier paragraph. In this particular case a portion of the front apron of the machine has been removed and reversed in order to show the internal construction. It is desirable that where wiring is run internally to a casting it should be protected either by a wire reinforced composition tubing or plastic sleeving and bushes must be provided where cables pass through the wall of a machine casting.

Where the motor moves relative to a machine it is, of course, essential that the wiring is carried either in a flexible cable of the multicore t.r.s. or p.v.c. sheathed type, or in flexible tubing, and in metal working machines it is desirable that the latter should be watertight.

Any separately mounted auxiliary equipment which has to be wired from the machine through flexible tubing should have a separate earth lead run inside the flexible tubing and earthed at both ends in order to preserve the earth continuity should the flexible tubing fracture.

As far as the machine itself is concerned, all component parts whether fixed to the machine or moving on sliding surfaces can be regarded as having earth continuity of no appreciable resistance and additional earth continuity conductors are not necessary in the connecting flexible tubing.

Conclusion

Very considerable development has taken place in the application of electrical equipment to machine tools during recent years and just as much attention has been given to this portion of the machine as to the mechanical design. It is, therefore, in the interests of the user to accept the makers' standard arrangement which has been proved in service and for which spare parts are available if needed.

B.T.H. SUMMER SCHOOL

ONCE again the British Thomson-Houston Co. is holding a Summer School at its Rugby Works. This was opened last Monday by Mr. E. H. Ball, Managing Director of the Company, who welcomed the assembly, largely consisting of professors and lecturers in electrical engineering.

Sir John Hacking, who gave the opening Address, expressed the views of the I.E.E. Council and the Education Committee on education. They were watching with interest the close collaboration between B.T.H. and the Rugby Technical College of Science and Arts. Generally speaking this collaboration, particularly as far as student courses and "sandwich" courses were concerned, should be developed more rapidly. Early provision for the training of technologists had not been enough, and there was also need for technicians. A ratio of five technicians to one technologist had been advocated.

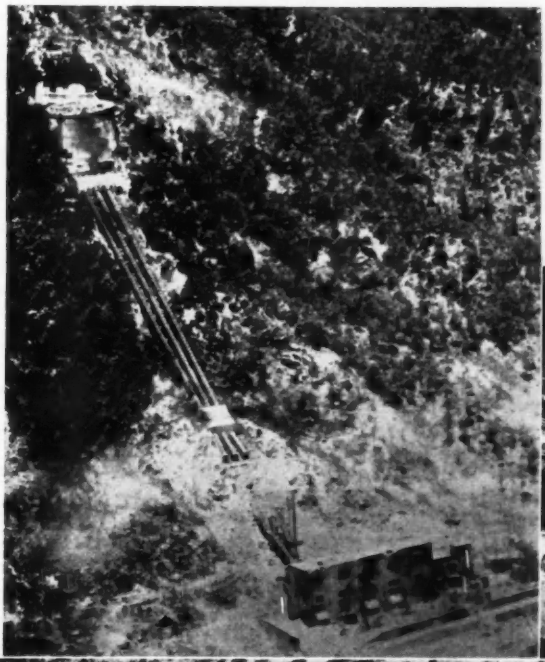
Owing to the time factor, existing colleges should be extended in preference to the building of new establishments, and a drive should be made to get boys interested in electrical engineering at an early age. He thought that certain designated colleges in close liaison with industry should not come under the local authorities but should have a fair amount of independence.

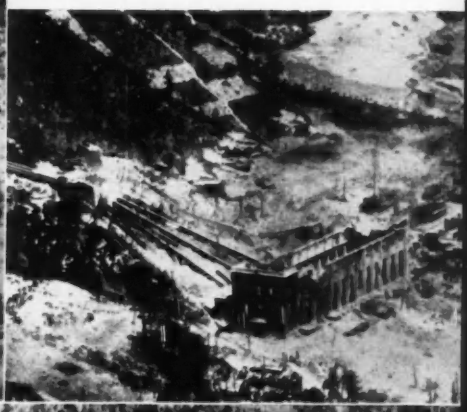
Turning to more technical subjects, Sir John had some comments to make on the 275 kV Grid. Pollution on insulators and economic factors were largely responsible for the selection of this voltage. The output of electricity was now running equal to or below last year's figures. While this might allow manufacturers to make up leeway in the plant requirements, nothing should be allowed to stop the natural load increase. To improve generating efficiency they were considering increasing pressures to 1,500 lb/sq in. at 1.050° F., and of 120 MW sets.

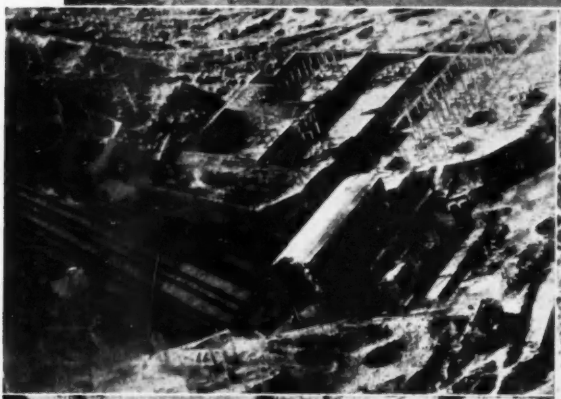
Damage to North Korean Power Plant

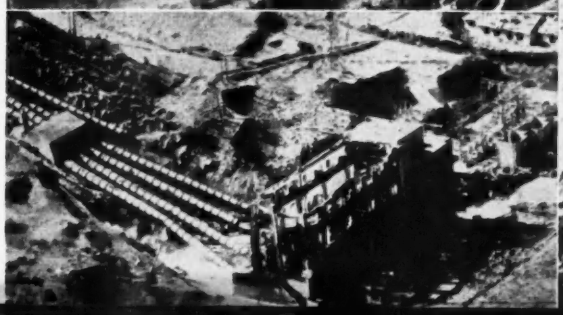
These dramatic photos show extensive damage to hydro-electric power stations after raids by United Nations Air Forces

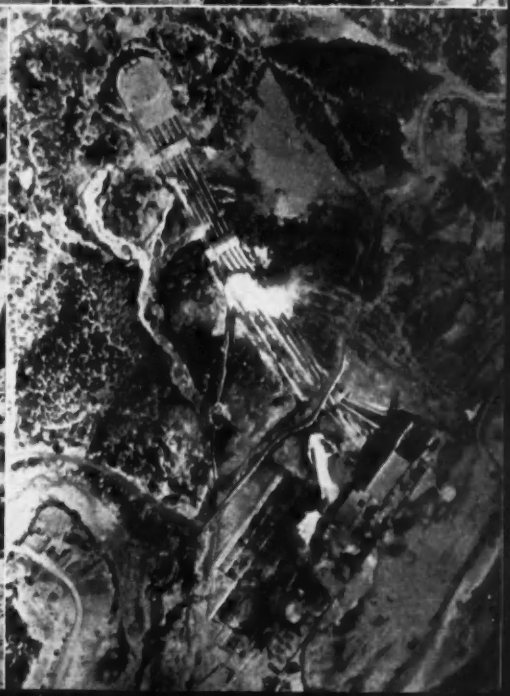
THESE pictures, taken just after the raid by over 500 U.N. aircraft, show the extensive damage inflicted on the many hydro stations in North Korean territory. Top left shows Chosen No. 3 station damaged. Top right shows Fusen No. 1 plant. Centre left, taken by a low-flying aircraft, shows Kyosen No. 1 plant destroyed, whilst bottom left shows Kyosen No. 4, and in bottom right water is seen discharging from the damaged penstocks leading to Kyosen No. 3.











Our readers' views . . .

Aluminium-Copper Fittings

WE were very surprised to see from your editorial "Warning on Aluminium" (issue July 10) that experience with aluminium-copper fittings in America seems to have been very different from that in this country. On turning up the American reports to which your editorial refers, we find the following:

Amongst the conclusions reached as the result of tests, not even one mentions metal purity. This strange omission makes us wonder if its importance is appreciated and if the fittings on test were made of the right grade of aluminium or aluminium alloy.

Some failures were associated with copper insets sweated into aluminium parallel groove clamps; such fittings are not, as far as we are aware, used in this country. Unless care is taken in manufacture, we know from experience that trouble is likely to occur.

Other failures occurred with cadmium plated copper split-bolt connectors; such fittings can be excellent as long as the cadmium is intact, but it is well known that once the copper becomes exposed then corrosion of the aluminium can take place. Such fittings are not used for aluminium-copper connections to any great extent in this country. Further failures occurred with copper split-bolt connectors using bi-metallic washers. Here again, such a method is not used in this country.

The most effective system used here is not even mentioned in the American report. We refer to the keeping dry of the bi-metallic junction by an insulating washer. This system has been used for over 25 years in this country and is standard practice here and on the Continent.

Based on accelerated exposure tests under the most severe conditions, the Americans' report makes some very sweeping statements and even deduces that aluminium-copper connections are, therefore, not safe under better conditions and may not last out the life of the conductor. In this country we are a little more suspicious of generalising from accelerated tests.

To summarise, it is clear that although failures have occurred with the types of fittings reported in the American tests, there is nothing in these tests to give the least cause for alarm in this country with the different types in use here.

C. H. E. Ridpath

Chief Electrical Engineer
ALUMINIUM WIRE & CABLE CO., LTD.

Static on Cars

THE short article in your issue of July 10, dealing with static charges on vehicles leads me to enquire if the full mechanism of the build up of these charges is fully understood. The general assumption that such charges are generated by friction is certainly true as far as the old rubber-tyred steam tractor and vehicles travelling in dry dusty weather conditions are concerned. But I have recently received shocks —one from a taxicab and one from a private car—in conditions of comparatively high humidity, in London. In each case, I was assured that these shocks were frequently felt on these particular vehicles. In fact in the case of the private car, the owner actually went to the length of fitting a trailing metallic chain.

Now what is it that should make these two perfectly standard vehicles exceptional? It was not in the case of the private car, at least, ignition trouble, as I was present when the whole system was checked in a garage. The only theory adduced was that a layer of dry french chalk between the inner tubes and outer covers was allowing slight relative movement between the rubber and the canvas, and this was in turn responsible for inducing a charge on the wheels and chassis.

Personally I doubt if this bears a close examination, but perhaps with the aid of the Stati-gun the actual mechanism has been traced.

E. Bartlett

LONDON, W.C.

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Colour and Control

IN connection with Mr. Oppenheimer's remarks on lighting in control rooms in your last issue, surely the question of colour is of considerable importance. While it is accepted that the pale green, so largely adopted as a general background, is probably most restful it is nevertheless monotonous. I understand that American experiments have been carried out on the colour coding of instruments. Apart from ready identification by the operator of the quantities being recorded, this also provides a relief to the eye and gives the necessary contrast required for alertness.

P. Griffiths

LONDON, E.C.4.

ULTRASONIC MEASUREMENT

Theory and Operation of the Resonance Method

The compactness of the equipment can be seen from this photograph

IN industry there are many cases where it is required to measure wall thickness where only one of the surfaces is available. The use of such non-destructive tests as the measurement of the back-scattering of radio-active sources has provided only a partial solution to the problem. Even where the material is thin enough to enable beta radiation to be employed (and this means a very thin sheet in the case of metals), the instrument must be calibrated by using a similar piece of material of known thickness, and an absolute measurement of thickness cannot be obtained. For virtually all metals, however, a gamma source must be used to obtain sufficient penetration. Unfortunately gamma rays, having high energies, are also dangerous to operators working in the vicinity, so that heavy shielding and fairly elaborate safety precautions must be employed. Furthermore, the thickness of metals which can be handled by existing isotopes is limited. The radiographic use for both natural and artificial radio-active isotopes recommended by the Atomic Energy Research Establishment is for the penetration of steel up to only 6 in thick.

Ultrasonic Measurement

The ultrasonic methods of measuring wall thickness do not suffer from the above disadvantages, and can be employed for virtually any wall thicknesses of both metallic and non-metallic substances likely to be met with commercially. Two such methods are available, namely: the ultrasonic pulse method and the ultrasonic resonance method. The first of these operates on a somewhat similar theory to a radar set, in that the time for a pulse to be transmitted through the material, to be reflected at the far surface and to return, is measured. If the velocity of sound in the medium is known, the wall thickness can readily be obtained.

When using this pulse method, however, the measurement of wall thicknesses below, say, ½ in. becomes inaccurate and difficult. The trace produced by the pulse method is difficult to interpret and needs a very high degree of skill to obtain consistent results.

The ultrasonic resonance method has the same advantages as the pulse method in accuracy, simplicity of operation and absolute calibration, and it has the additional advantage that it requires no measurement of time, so that the whole instrument can be made simple and robust. The Dawe Ultrasonic thickness gauge, which works on this principle, is self-contained, since it works from dry batteries housed within the 12 in. by 14 in. by 8 in. case. Moreover, the weight of the instrument is only 23 lb, so that it can be slung over the operator's shoulder and carried about all day.

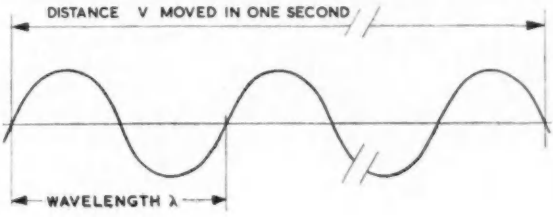


Fig. 1. Diagram to show harmonic principle (see text)

This small size is extremely useful for all types of application, but more particularly for pressure vessels. The instrument will pass through a porthole of only 18 in. diameter, such as is often found on this type of vessel. The absence of any cathode ray tube is a big advantage for many grades of work, where the incorporation of such a device would almost automatically exclude the use of the instrument. In addition, the absence of any connection to an electrical mains means that these thickness gauges can be slung down the side of a ship or into any other awkward position.

Since no mains supply is required, this type of thickness gauge can also be taken over all types of terrain to inspect pipe lines, tunnel linings and the like.

Theory of Method

At this point it is worth saying a few words about the theory of the ultrasonic resonance method. Briefly, a vibrating quartz crystal is placed in contact with the available face of the material under test. By frequency-modulating the electronic oscillator which drives the quartz crystal, a signal is produced at a fundamental frequency and at harmonics of this fundamental frequency. The frequency at which the crystal is driven (always below the natural frequency of the crystal itself) can be altered by turning a calibrated dial on the instrument. The crystal injects an ultrasonic wave into the material, through which it is then transmitted in the form of a narrow beam. On reaching the far (and inaccessible) surface, the wave is reflected, at least in part, backwards along the way it came. (It should be noted that sound waves are reflected by any interface between materials where the velocity of propagation of sound of the two materials is different. This also applies to dissimilar substances such as gas and solid, liquid and solid and so on, with the occasional exception of mercury and a metal). Now, if the whole path —comprising twice the wall thickness—coincides with a whole number of wavelength of the ultrasonic wave, then the transmitted and reflected waves will find themselves in phase. The result of this combination will be a relatively large increase in the amplitude of the wave in the material and of the sound in the headphones of the thickness gauge, or in the reading of the meter mounted on the instrument. This condition is fairly critical and the exact position of resonance can be obtained accurately. For the special case of the fundamental frequency the pathlength will be *equal* to the wavelength of the wave. Now, fundamental frequency of wave (f_1) times the wavelength (λ) = velocity of sound in the medium (V).

This will be obvious from the simple diagram reproduced herewith. We have therefore the simple relationship that

$$\text{Wall thickness} = \lambda/2 = \frac{V}{2 f_1}$$

It is now possible to see why an ultrasonic wave is used rather than a more normal audio wave. The most cogent reason is that we should require very large and expensive crystals to couple in audio frequencies. Moreover, if we assume that the highest frequency which can be detected by the human ear is 20,000 cycles per second, and that the velocity of sound in steel is 19,300 ft/sec, then the *thinnest* wall thickness that can be measured using the

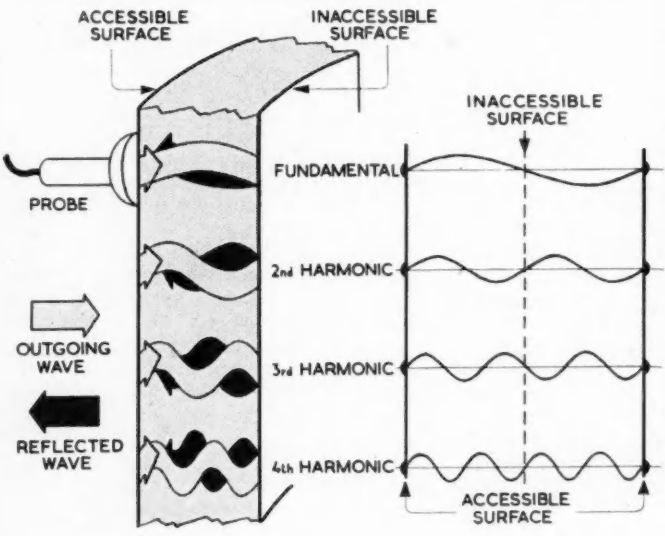


Fig. 2. This diagram shows the harmonic modes traversed by waves of different frequencies in a material. Both forward and reflected waves are shown

fundamental of an audio wave is

$$\frac{1}{2} \times \frac{19{,}300}{20{,}000} \times 12$$

or roughly 6 in., and correspondingly thicker walls by using the harmonics. By using ultrasonic frequencies of 20 megacycles/sec, and higher, it is possible to measure thickness down to 0·005 in., or less. In other words, the shorter wavelengths associated with higher frequencies give much greater accuracy. The normal commercial limit is, however, in the region of $\frac{1}{16}$ in., since many materials absorb energy very rapidly at these high frequencies.

The lowest *fundamental* frequency available when using the Dawe instrument is about 800 kc/sec, so that all wall thicknesses over 0·145 in. in steel and *pro rata* in other materials are measured by the aid of harmonics. Here the procedure is to rotate the dial until the sound in the headphones indicates that a maximum signal has been reached. A record is then taken of the frequency. The dial is then rotated again until the *next* maximum sound level is indicated in the headphones. By subtraction of these two frequencies the fundamental frequency is obtained. This can be readily seen since, say, the fourth and fifth harmonics will be $4f_1$ and $5f_1$ respectively, where f_1 is the fundamental frequency. By subtraction we obtain

$$5f_1 - 4f_1 = f_1$$

or the fundamental frequency. (See Fig. 2).

Simplicity of Operation

To indicate the relative simplicity of operation, the writer was able, after only a few minutes' instruction, to measure a flat piece of steel strip which had been ground to size and measured by micrometer, so that the performance of the thickness gauge could be checked. The following readings were obtained, and it should be remembered that the operator was using the instrument for the first time:

First max.	1·53 Mc/s	(actually 4th harmonic)
Second ,,	1·91 Mc/s	(actually 5th harmonic)
Difference	0·38 Mc/s	(frequency of fundamental).

Applying this result to our formula we have

$$\text{thickness of piece} = \frac{1}{2} \times \frac{19{,}300 \times 12}{0{\cdot}38 \times 10^6} = 0{\cdot}305 \text{ in.}$$

This result should be compared with the thickness as measured by a micrometer, which was 0·308 in. This gives an accuracy of just under 1%, if the micrometer reading is considered to be the true thickness. The accuracy guaranteed is actually ± 3%, provided that the working surfaces are clean and flat.

A series of tests was carried out at G. A. Harvey and Co. (London) Ltd., Woolwich Rd., London, S.E.7 (the well-known manufacturers of oil refinery and chemical plant), on a test block with wall thicknesses of known value. The thicknesses ranged from $\frac{1}{16}$ in. up to $3\frac{1}{2}$ in., and the greatest deviation anywhere in the range from the figure given by a micrometer was under one per cent.

Although reference was made to the fundamental formula, this is not necessary in practice, since the instrument has a built-in computer which eliminates the need for any calculation by the operator.

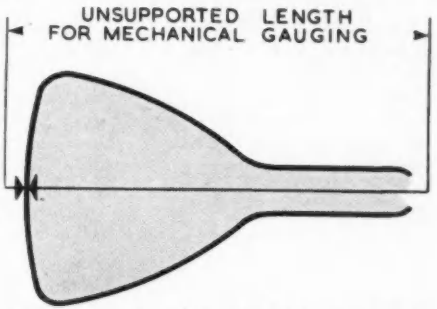


Fig. 3. The difficulties of mechanical gauging are shown here

Rough Surfaces

This type of thickness meter has the advantage that it tends to record low on surfaces marred by rust and the like. In fact, when measuring, say, against a scale-covered surface the thickness of the scale is not measured, although there is usually a reduction in signal strength which does not, however, affect the accuracy of the measurement. Also, paint has no effect on the reading.

For really rough surfaces, such as are met with in shipbuilding, a small amount of surface preparation by filing or grinding is required to provide a suitable surface to which the crystal unit can be applied. A thin film of oil, grease, glycerine or vaseline, however, provides a sufficiently good ultrasonic coupling between the crystal and the work for all normal purposes. Special crystal units can be supplied for tests on curved surfaces.

It has already been mentioned that the velocity of sound in steel is substantially independent of the chemical composition of the steel, previous heat treatment, internal stresses, temperature, etc., and does not vary more than about 1% over all ordinary commercial steels. A similar consistency holds good for other materials such as copper, nickel and aluminium. Alloys such as brass and cast iron are, however,

much more variable and here it is usual to carry out a preliminary test to set the computing scale before taking measurements. So far we have only considered metals, but measurements can equally well be taken on glass or on plastics. The thickness range of the instrument for steel is roughly from $\frac{1}{16}$ in. to 12 in., and proportionately for other materials.

C.R.T. Thickness

Some uses of the Dawe Ultrasonic thickness gauge in the heavier industries have already been mentioned. Whilst it is true that ship repairing, where up to 1,200 drillings may be required in the plates of a single tanker to check that excessive corrosion has not taken place, is one of the cases showing exceptional savings, there are many less spectacular but equally fruitful applications. One of particular interest to the electrical industry is in checking the wall thickness of cathode ray tubes. True, this can be done, before the tube is sealed, by some form of mechanical device such as specially designed callipers. Apart from being cumbersome, however, it is difficult to obtain any high degree of accuracy with mechanical devices due to wear and slackness in the mechanism generally and in the pivot in particular. With the thickness gauge described in this article it is a simple matter to check the thickness of, say, the viewing face of the tube even when it has been sealed off. This is a most important step towards obtaining and holding the confidence of the general public, who encounter each day a cathode ray tube in a television set. When it is considered that a pressure of 14·7 lb per sq/in. over the area of a disc 15 in. in diameter will represent a total force of over 22 cwt, then that on the whole surface of a normal television tube may well amount to a total of not less than *several tons*. Though this force will be inwards rather than outwards, ensuring that a sufficient margin of safety is present when the tube is evacuated is not always an easy task. This problem is much facilitated if the wall thickness can be checked by a supersonic instrument.

This gauge is simple to use, but any problems concerning its application or maintenance will gladly be answered by Dawe Instruments Ltd., 83 Piccadilly, London, W.1, who are producing this instrument under licence from Branson Instruments Inc., and the General Motors Corporation of America.

R.I.C. Specifications

THE problem of standardisation of components used in the radio industry has been carried a stage further toward solution by the issue of three further specifications prepared by the Radio Industry Council at 59 Russell Square, W.C.1.

These specifications in their present form are for use internally within the industry, but it is intended to submit them in due course to the British Standards Institution. It is hoped that by the time that stage has been reached it may have been possible to co-ordinate the respective requirements of the industry and of the Services for these components in the form of comprehensive National Standards.

The three new specifications are: No. RIC/151, "Switches, Dolly Operated"; No. RIC/154, "Switches, Wafer Rotary"; and No. RIC/251, "Valveholders, Electronic Receiver Types." Sections 1 and 2 of all these are available, Section 3 will, however, follow in due course.

In addition to the above, Sections 3 of RIC/111, "Resistors, Fixed Wirewound Non-insulated," RIC/122, "Resistors Rotary Variable Composition Track" (with or without switches), and RIC/133, "Capacitors, Fixed Ceramic Dielectric, Grade I," have now been made available.

Prices are as follows: RIC/151, Sections 1 and 2 together, 6s. per copy; RIC/151, Sections 1 and 2 together, 6s. per copy; RIC/251, Sections 1 and 2 together, 5s. 6d. per copy.

The complete versions of RIC/111 costs 9s. per copy, that of RIC/122 costs 5s. per copy, and that of RIC/133 8s. per copy.

It will be recalled that Sections 1 and 2 deal mainly with the performance requirements and production tests, while the third section is concerned with dimensions and tolerances.

Some twenty-four specifications, covering a large part of the component field, have now been issued by the Radio Industry Council with the co-operation and agreement of B.R.E.M.A., R.C.E.E.A. and R.E.C.M.F., whose individual contributions to the substance of the specifications have been co-ordinated and edited by the Technical Specification Committee of R.I.C., and have been authorised for publication by the Technical Directive Board of R.I.C. on which all the constituent associations of the Council are represented.

Jubilee at Upper Boat

SOUTH WALES STATION CELEBRATES 50th YEAR

THIS year marks the 50th Anniversary of Upper Boat power station, the foundation stone of which was laid on April 30, 1902, by Sir Frederick Bramwell, Bt., D.C.L., LL.D., F.R.S., the senior partner of Bramwell and Harris, of Westminster, the consultants to the South Wales Electric Power Distribution Co. The first public supply from this station was given in April, 1904.

Original Plant

The original generating plant consisted of 14 Niclausse boilers supplying steam at 200 lb per sq in. to three Willans engines, coupled to Ganz alternators of 1,500 kW capacity each. These were of the flywheel type, generating three-phase at 25 cycles; the exciter armatures were mounted on the main shaft with no exciter bearing. It is reputed that they were the first sets in this country to generate direct at 11,000 V—only in 1902 the maximum pressure for overhead lines had been specified as 500 V ! Apparently, no English maker was prepared to build machines of this voltage, so the order went to the Austrian firm.

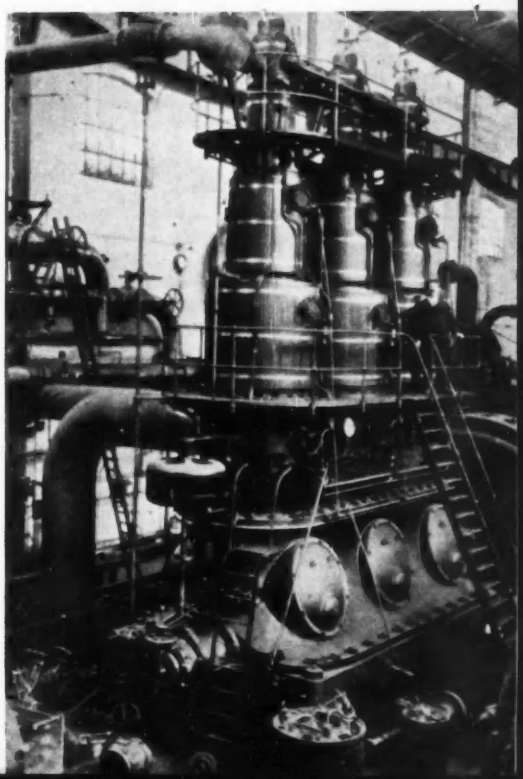
The Willans engines were unique; only four of this size were ever built, and three came to Upper Boat. They were three-crank triple expansion central valve engines of some 2,500 h.p. and, as they had a speed of only 150 revolutions, were of massive construction. The 14 hand-fired Niclausse boilers evaporated 6,000 lb of water per hour at 200 lb per sq in.

The reciprocating engines were run until 1908, when a British Westinghouse turbo-alternator of 3,000 kW output was installed; two Willans-Dick Kerr sets of 3,000 and 5,000 kW were added in 1911 and 1914 respectively. Two Babcock and Wilcox boilers were installed in 1917 and two Niclausse boilers in 1921, each of these evaporating 30,000 lb of water per hour at a pressure of 180 lb per sq in.

Steady growth of demand led, in 1920, to an order for an 18,750 kW turbo-alternator from C. A. Parsons and Co. for a steam pressure of 350 lb per sq in. Even before this set was commissioned in 1923, however, it was evident that more plant would be needed and Mr. J. S. Highfield—later senior partner of the firm of Highfield and Roger Smith—was appointed as consulting engineer for further extensions. This necessitated the raising of additional capital.

When the new extensions were opened by the Rt. Hon. the Earl of Plymouth on April 26, 1927, there was, in addition to the Parsons set in the old part of the building, a 16,000 kW English Electric turbo-alternator generating 3-phase 25 cycle alternating current at 11,000 V, with two auxiliary sets each of 1,000 kW output. In the new boiler house there were eight Babcock and Wilcox C.T.M. type boilers of 60,000 lb/hr capacity producing steam at a pressure of 350 lb and a temperature of 750° F. Each of these was fitted with three chain grate stokers. In 1929 a 25,000 kW Parsons set was installed.

In 1930 financial control of the South Wales Electric Power Co. was taken over by the Shropshire, Worcestershire and Staffordshire Electric Power Co., a subsidiary of the Edmundson Corporation. When additional capital was raised in 1932, these holdings were again



This picture shows one of the old Willans steam engines

transferred by the Shropshire Co. to the parent company, Edmundsons Electricity Corporation.

Frequency Change

A new problem had by now arisen—the changing of frequency from 25 cycles to the proposed standard rate of 50 cycles and, with generating plant totalling 57,000 kW this was no light task. The change-over was accomplished by 1937, however, and then the station was once more in the forefront in adopting a transmission voltage of 33,000 V and an 18,750 kW Parsons 25-cycle machine was fitted with a 50 cycle alternator generating direct at 33,000 V. Later, it was decided to increase to 66,000 V for main transmission, and air blast switchgear was introduced. At the time of these last changes, the station superintendent was Mr. H. V. Pugh, who returned to South Wales in 1948 as divisional controller.

After the passing of the Electricity Supply Act of 1926, Upper Boat became a selected station and was first connected to the grid in 1934. In consequence of this, further extensions and alterations were made to bring the station to its present-day capacity of 155,000 kW.

The station commenced using pulverised fuel in 1938 when a Babcock and Wilcox boiler, evaporating 182,000 lb of water per hour at a pressure of 650 lb and a temperature of 850° F, was installed. Two similar boilers were added in 1939, and a further one in 1940.

The first 30,000 kW set in this station was installed by the English Electric Co. in 1939, generating direct at 33,000 V; a similar set was added in 1940. These great increases in generating capacity brought to a head the problem of cooling water. While, in the earlier days, the River Taff had provided adequate cooling supplies, in 1940 it was found necessary to erect a cooling tower with a capacity of 1,500,000 to 2,250,000 gallons per hour on what is essentially a river site station.

A further 30,000 kW set of the English Electric Co. was commissioned in 1942, generating at 11,000 V with a generator transformer stepping directly up to 66,000 V. In this same year, two further boilers were installed—a Babcock and Wilcox P.F. boiler evaporating 364,000 lb of water per hour and a Mitchells Stirling type boiler of 182,000 lb/hr capacity with a Babcock style 28-chain grate stoker; both boilers have a pressure of 650 lb and a temperature of 850° F.

Anniversary Dinner

A 50th anniversary dinner was held by the Sports and Social Club on May 17, 1952, and, apart from the existing staff, this was attended by many of the old employees at Upper Boat power station, with long records of service there. There was a most interesting exhibition of photographs showing not only old plant and drawings of the old station, etc., but the fashions of previous days—with emphasis on top hats, bowler hats, and stiff linen collars of great height.

The photographs bore witness to great developments at the station from the purely scientific aspect—there was also clear evidence of the change in social conditions which has taken place during the same period.

WELDING RESEARCH, 1951-52

IN the past year particular emphasis has been placed on research into the development of processes using gas shielded consumable bare electrodes. This work, described in the annual report of the British Welding Research Association, involves the determination of the fundamental arc characteristics, the minimisation of weld porosity and the metallurgical features of welds in certain non-ferrous alloys. The electrical side of this work has been undertaken in collaboration with the E.R.A.

The various engineering committees concerned with the load carrying capacity of welded structures, the problems of fatigue, pipe lines, pressure vessels, pipe connections and fittings, etc., have carried their work further forward.

Electrically, the more interesting committees were those engaged on the problems associated with resistance welding. Progress here has been made on the design and construction of a simple robust workshop instrument to record current and load simultaneously on a time base. Two research reports on the spot welding of 24 s.w.g. and $\frac{1}{8}$ in. material have been written and will be made available to members of the Association.

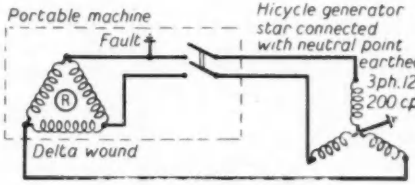
Ordinary membership is now 235 and associate membership 19, compared with 214 and 18 at the date of the previous report. Requests to the Association numbered 160, and in addition 113 important inquiries were dealt with by telephone.

Income for the year was £88,624 and current expenditure was £70,326, to which should be added £13,716 to the Fatigue Laboratory Building and Special Equipment Fund, and £1,000 to reserve for plant replacement. The surplus of £3,582 has been added to the Accumulated Fund.

Problems and Practice
IN ENGINEERING

D.P. Switching in 3-phase Machines

THE following circuit will serve to illustrate a disadvantage of the practice of double-pole switching on 3-phase Hicycle portable tools. As can be seen from the diagram, although the D.P. switch is off, current will flow from generator via windings of portable tool and earth fault back to generator. Under



Fault not isolated by switch

these conditions the rotor will rock violently, keeping in mind the supply is 200 c.p.s., as soon as machine is plugged in. If some time elapses before supply can be switched off damage to machine would probably result, more so in the case of a portable grindstone which may be resting on the ground when plugged in. This case would point to the use of triple-pole switching.—*W. Adam.*

Brush Pressure

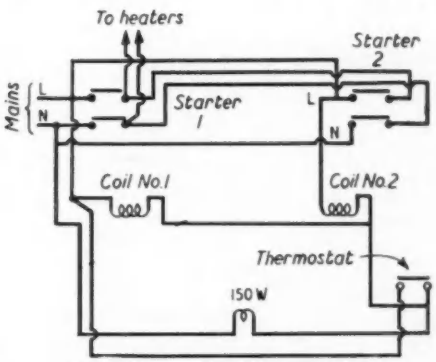
REFERRING to your correspondent R.A.'s notes on the above (July 3 issue), and his friendly criticism of my note on "Loose Ends" (June 19 issue), I think he may have misconstrued my point on commutator maintenance and the use of a spring balance to check brush pressures. Editorial cuts were made to my original notes, owing to their length, and some of the context may thus have been lost.

My main point was the time used by maintenance personnel in cleaning certain parts religiously whilst neglecting more important items, amongst which I included brush pressure.

R. A. states that "brush pressure has been taken care of once and for all" by the maker's grade of brush and design of spring. With this I cannot agree, for in certain old established plants, d.c. motors whose average age is 30 years, are still giving good service, but it surely cannot be considered that the original grade of brush is as efficient as a modern one for the same type of duty. The new grade may require a different pressure which is given by the brush makers in their lists of brush grades for various duties. Again, brush springs age, especially when due to broken or loose brush shunts and/or worn boxes, they have carried current. Their tension can thus vary and it is important that the pressure of each brush on a motor should be equal, hence the usefulness of the spring balance to correct any differences that arise due to aged and weakened springs. If correct brush pressure "was of course of importance to the motor manufacturer" then of course it is of equal importance to the maintenance engineer, who keeps the motor running efficiently after a life of arduous service and often ill-treatment by operators. It was not my intention to make the use of the spring balance appear as routine maintenance, but rather as a check after brush trouble or when new brushes had to be fitted.—*T. H. Snelson.*

Inverted Thermostatic Control

LABORATORY test required that a tank of water be kept at a constant temperature of 55° C. There was nothing with which this temperature could be maintained except four immersion heaters and a tube containing mercury as a thermostat. This "made" when the mercury rose under heat, and "broke" when the temperature fell, the reverse to that required. By using a 150-watt lamp and two



150 W lamp used in series with coil

starters (one by itself was not large enough) the heater is working perfectly, cutting out at 55·4° C and in at 54·8° C.—*D. F. Weeden.*

New Fittings for the Osram Circle

Attractive modern designs introduced by G.E.C. use the circular fluorescent lamp

INTENDED for use with the Osram circle, a 16-inch diameter circular fluorescent lamp of a novel type, some new G.E.C. fittings are suitable for the home, hotels, restaurants, theatres, cinemas, commercial buildings and shops, wherever, in fact, a decorative fluorescent fitting housing a lamp of medium light output is required.

The first models in the new range comprise ceiling and pendant units and a floor standard. The simplest design (F36624) is a ceiling fitting, the basis of which is a cream-coloured metal spinning which houses the control gear and at the same time supports the lamp. A more elaborate variation on this theme (F36625) is a fitting which incorporates with the same metal spinning, a white flashed opal glass disc below the lamp and a pleated paper diffuser. This model is available either as a ceiling or a pendant fitting.

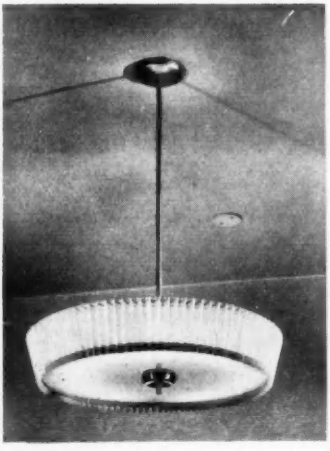
A similar range of fittings incorporating the Osram tungsten ballast circuit will also shortly be available. This circuit will provide instant starting and eliminate the necessity for a choke.

In the simpler of these fittings (F36626) the Osram circle is left exposed and the filament lamp is screened by a white plastic shade. The decorative version (F36627), which is available as a ceiling or a pendant fitting, encircles the fluorescent lamp with a pleated paper diffuser and incorporates a white flashed opal glass disc below it, while the filament lamp is accommodated in an aluminium reflector.

A most attractive model is the (F39006) floor standard in West African agba wood finished to a natural walnut colour, with brass relief.

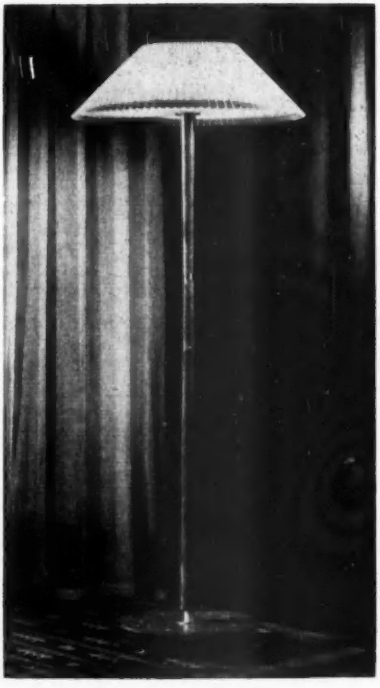
The gap between the ends of the lamp is filled by a special 4-pin plastics cap, which completely closes the circle. A special white plastics connector (F1518) has been designed for the cap and is now available.

The lamp is rated at 40 watts, the necessary control gear (switch start) being that already in use for straight lamps of the same rating (choke F8311/3/4/5 and capacitor F8525) except in the case of the two fittings F36626 and F36627 which are fitted with an Osram tungsten ballast lamp and a small heater transformer of the appropriate voltage rating.

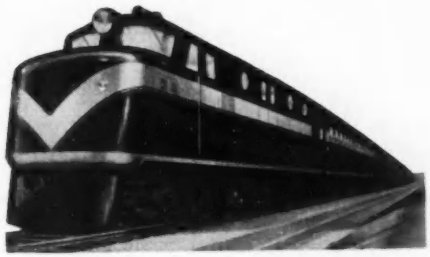


The F36625 design is a cream fitting with white flash opal glass disc and pleated paper diffuser. Relief in satin brass. Diameter: 22½ ins. Depth: 5½ ins. On the left, is the pendant version.

Right, is F39006. West African agba finished to natural walnut colour in pleated brass relief. The 28 ins. diameter shade is of pleated paper



A LIGHTWEIGHT Diesel-electric Loco



A new type developed for remote overseas operation in conditions where tracks are indifferent and maintenance facilities few and sparse

SPECIALLY designed for use in areas remote from full maintenance and overhaul facilities is a new diesel-electric locomotive rated at 955 h.p. The makers of this locomotive, Birmingham Railway Carriage and Wagon Co., Ltd., Crompton Parkinson, Ltd., and Sulzer Bros., Ltd., have borne in mind the difficulties, civil, electrical and mechanical, encountered in new territories being opened up, and in existing sparsely populated areas of the world. Thus they have produced a locomotive suitable for narrow gauge working, combining low weight and axle-loading (10 tons), which can replace, without exerting heavier stresses on tracks and bridges, steam locomotives with six- or eight-coupled wheels.

Mechanically, the engine is built up on steel box structures instead of rolled sections, the space within the main frame being used for air ducting. The main frame itself is electrically welded throughout and designed to take an end buffing load of 100 tons with flexing reduced to a minimum.

Two bogies are used, each of the three-axle swing-bolster type, and because of the indifferent track conditions liable to be met in use, particular attention has been paid to the suspension system.

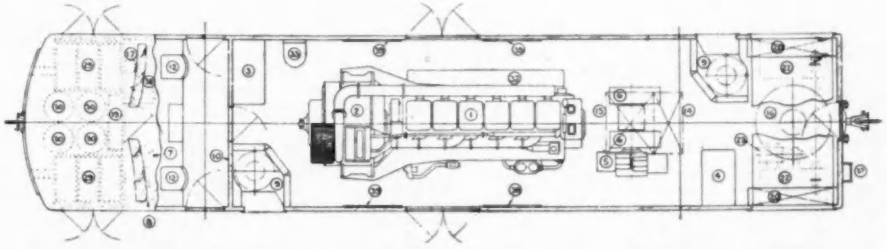
The outer axles of each bogie are motored by an axle-hung motor with plain suspension bearings, and forced ventilation is provided for each motor. To maintain ventilation when the locomotive may be coasting with engine and blower shut down, each motor is also provided with a self-driven fan.

Main and auxiliary generators are combined in one single bearing machine, the generator being directly coupled to the diesel engine and supported at the inboard end on the engine main frame.

Auxiliary services—radiator fan, compressor, water pump and traction motor blowers—are all driven by drip-proof electric motors designed for locomotive service and are supplied at 110 volts d.c., lead-acid or alkaline batteries of this voltage being installed for starting or standby purposes.

Control

Control of the locomotive is by one main handle which regulates the engine power, and automatic load control is fitted to make it impossible for the diesel engine to be overloaded at any speed or trailing load conditions. This control also ensures that the diesel engine runs at the lowest possible speed for the



Plan view of the locomotive and auxiliaries. 1, ENGINE; 2, GENERATOR; 3, MAIN CONTROL CUEICLE; 4, AUXILIARY CONTROL CUBICLE; 5, AIR COMPRESSOR; 6, TRACTION MOTOR BLOWER; 7, CONTROLLER STAND; 8, AIR BRAKE STAND; 9, AIR FILTER CABINET; 10, AIR FILTER TO CAB; 12, SEAT; 14, AUXILIARY WATER TANK; 15, AUXILIARY FUEL TANK; 16, RADIATOR FAN AND MOTOR; 17, HANDBRAKE; 19, CLOTHES LOCKER; 20, RADIATOR; 22, WATER TANK; 23, WATER PUMP AND MOTOR; 29, BATTERIES; 30, AIR RESERVOIRS; 32, FUEL TANK 700 GAL.; 38, DRINKING WATER COOLER; 39, TOOL RACK.

required output. Protection is provided against loss of oil or water pressure, excess water temperature, over-current and earth leakage. Control gear itself is accommodated in dust-tight cubicles with large inspection doors. Main contactors and reversers are of the electro-pneumatic type, while the smaller contactors are electro-magnetic.

Air and/or vacuum brakes—and, where required, rheostatic brakes—are fitted to the locomotive to suit operating conditions. The Sulzer anti-slip brake for assisting heavy starts under bad track conditions, is also fitted.

Routine inspection and periodical maintenance is greatly assisted by the layout of the power units, auxiliaries and the locomotive design. Two upholstered seats are provided in the cab, and the driver's desk is arranged for easy working.

Performance Figures

Maximum speed is about 50 m.p.h., and the maximum tractive effort about 27,000 lbs. with 30% adhesion. At 11 m.p.h. the one hour tractive effort is 20,000 lb., and at 15 m.p.h. this falls to 15,500 lb.

In normal conditions the b.h.p. output on a one-hour rating is 1,035 h.p. at 750 r.p.m., falling to 925 h.p. at about 700 r.p.m. for continuous running. In semi-tropical conditions these figures are down-graded to 955 and 850 h.p. respectively.

Maximum weight is 60 tons, with an adhesive weight of 40 tons, and overall dimensions are 41 ft 10 in. long (over headstocks), by 9 ft 4 in. wide by 12 ft 9 in. high.

Nineteen of these locomotives are now being built for operation in Australia and West Africa.

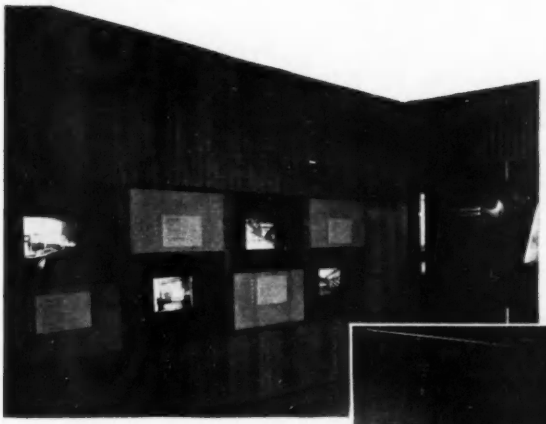
The New ELECTRICAL SECTION *at the* BUILDING CENTRE

SPEAKING at the formal opening of the electrical section at the Building Centre in London last week, Mr. H. T. Young, M.I.E.E., chairman of E.D.A.'s Building Centre Committee, said that in the early days architects did not quite realise—as they were now beginning to do—that electrical services required accommodation in buildings. They used to put in a few lights and a meter, but it required more than that. They now realised and Mr. Young was convinced that the Centre had done a great deal to help this—that proper facilities must be provided for services in buildings. As an example of the importance of providing facilities Mr. Young quoted a building in London which used as much power as the Isle of Wight. He said that architects were beginning to realise that when a building is erected it has to last 50 or 100 years and in view of the progress of electricity, facilities had to be provided for alterations, extensions and developments.

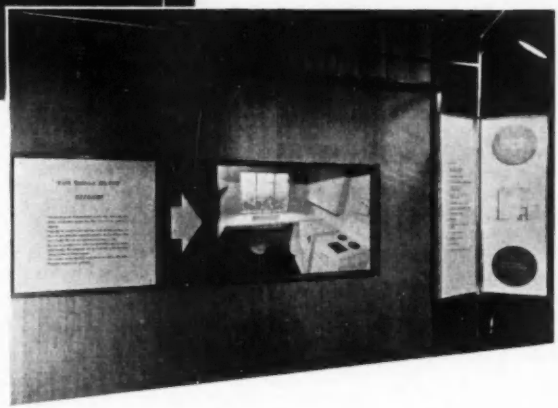
With this in mind the designer Mr. Hume Chadwick, A.R.C.A., has arranged the electrical section so that it will give current information on electrical matters so that they can consider thoroughly different types of installations when drawing up their plans.

In the limited space available E.D.A. have, of course, found it impossible to show all aspects of the application of electricity, instead they have concentrated on achieving a display which has an appeal mainly to the architect, surveyor, builder and, of course, the student.

At the opening ceremony (left to right): Mr. E. A. Mills (Dep. Chair. L.E.B.), Mr. H. Nimmo (Chair. Southern Bd.), Mr. E. Long (Sec. B.E.A.) and V. W. Dale (Gen. Man. E.D.A.)

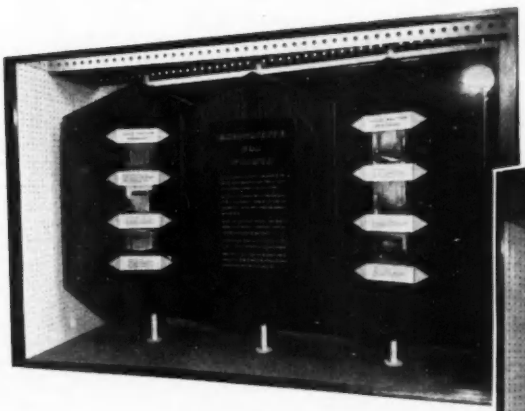


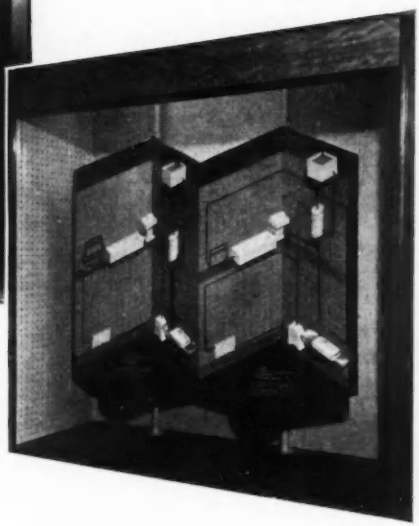
On the first floor of the Centre the section is designed to give a summary of the best principles of installation and utilisation; In the one room the whole of one wall is given up to intake methods, the different circuits and types of wiring. Four sets of revolving sequences of illuminated colour transparences show lighting schemes for various interiors. The sequences can be push-button stopped for closer inspection. Situated in the second room the sequences are shown on the left . . .



. . . . Also in the second room are illuminated diagrams of domestic and school kitchens and a cafeteria. Following the standardisation in small house construction basic schemes for electric kitchens have been evolved by E.D.A. to help architects. That illustrated (right) is for a working kitchen of 100 sq. ft floor space . . .

. . . here also information on space heating is given, the display (below) is concerned with the definition of purposes for which different appliances are suitable with photographs of an oil-filled radiator, convector, forced-air convector, tubular heaters, panel heaters and a "safety" electric fire . . .





. . . the correct and incorrect methods of installing a coal-electric hot water system are illustrated in this display (right)

overseas news

Rural Supplies in New South Wales

Evidence that the New South Wales Government's rural electrification scheme was a material factor in the national drive for increased food production, was given recently by Mr. J. B. Renshaw, Minister for Public Works. Since its inception in 1946, he said, the Government's rural subsidy scheme had connected electricity supply to 15,000 farms, out of a total of 26,500 new rural consumers. Approved applications provided for the connection of a further 7,000 rural consumers, including 4,000 farms. As a direct result of the Government's rural scheme, about 44% of the State's 71,000 farms were now connected with electricity, placing N.S.W. well ahead of all other States in this respect. Total cost of this work, completed and projected, would be in the vicinity of £6,000,000, of which £2,500,000 would be met by Government subsidy. Of the estimated total of £6,000,000, more than £475,000 was earmarked for electrification in areas controlled by the 12 Shire and Municipal Councils represented in the Lachlan Valley Development League. Approved subsidies against this amount totalled £201,730, of which £73,336 had already been paid out. In the Lachlan Valley alone, 1,270 new consumers, including 910 farmers, had already been connected under the scheme.

Advisory Committee

The Australian Government has set up a special committee to advise it on specialised electrical equipment for defence. Chairman of this Electrical Industry Advisory Committee is Mr. C. W. Goodman, general manager for Australia of the English Electric Co., Ltd., of Sydney. The other members are: Mr. S. E. Barratt, director of production, Australian General Electric Pty., Ltd., Sydney; Mr. A. L. Blake, general manager, Cable Makers (Aust.) Pty., Ltd., Sydney; Mr. J. Wilson, managing director, Wilson Electric Transformer Co. Pty., Ltd., Melbourne; and Mr. A. T. Bridge, works director, British General Electric Co. Pty., Ltd., Sydney. It was recently announced that the Government hoped to place defence orders worth £8,000,000 with Australian radio and electrical firms by December, 1953.

Loan for Development

The International Bank has announced a $50 million loan to Australia for the development of agriculture, mining, the iron and steel industries, railway and road transport and electric power projects, it is reported.

Fremantle Take-Over

The terms of the agreement for the sale of the electricity undertaking of the Fremantle Municipal Tramways and Electric Lighting Board to the State Electricity Commission of Western Australia, to which we referred on May 15, provides for the Commission to pay the Board £700,000, it is now revealed. (The transfer officially took place on June 1.) Of that sum, £550,000 has been invested with the Commission at an interest rate of 4%. Provision is made for this interest rate to be reviewed at five-yearly intervals, also for the payment of either the full amount or part, not being less than £10,000, at any time on receipt of 12 months' notice by either party. The Board will hold the £550,000 in trust and the interest derived from this sum shall, if necessary, be appropriated to meet any loss on the transport service. Alternatively, the interest will be apportioned between the two local authorities.

Saskatchewan Expansion

A ceremony marking the completion of a $1,000,000 expansion programme at the Saskatchewan Power Corporation's plant at Prince Albert took place recently. The ceremony included the commissioning of a 10,000 kW turbo-generator. Completion of the unit almost doubles the capacity of the plant, which has been operating at 12,500 kW, and coincided with the completion of the 69,000 V interconnecting transmission line between Prince Albert and Saskatoon via Humboldt.

Raise Tariffs or No Capital?

Although the necessary capital has been obtained to cover existing power expansion schemes up to 1955, by the electricity supply industry in Spain (about 80% of which is in the hands of a small number of private companies), representation has been made to the Government that the industry has no margin beyond that point, and that on the basis of present plans there will be a deficit of about 3,000 million units a year by 1960. To cover this deficit, it is suggested that additional capital of about 10,000 million pesetas be raised at once. But this, the industry warned the Government, will not prove possible unless the undertakings are allowed to increase their tariffs and as a result provide a better return for shareholders.

Austria Needs a Loan

It is anticipated that Austria will probably float a loan this autumn to finance her hydro-electric construction programme. The loan is

likely to carry especially favourable tax repayment terms and a clause guaranteeing no depreciation in the value of the bonds. It will pay interest of between 5 and 6% p.a. The extent of the loan is not yet known, but the capital investment needs of Austrian power plant run to one thousand million schillings annually, of which about three-fifths have been met up till now out of E.R.P. funds. This year E.R.P. advances will only provide for one-third of the capital requirements and from 1953 onwards the funds available will be even smaller, it is stated.

Milan-Naples Line

At the end of this month test trials will be made of the first three 7-car electric trains which are to be put into service on the Milan-Naples railway line. The journey will be completed in under eight hours, at a speed exceeding 115 km an hour in many places. Downhill trials have been made with the electric train on the Rome-Frascati line and experiments of the same nature will be conducted on other parts of the Rome-Naples line, and on the Rome-Florence and Florence-Milan lines.

Escom Order

We now learn that the Electricity Supply Commission of South Africa has placed with the General Electric Co., Ltd., of England, a contract for a 60 MW, 11·8 kV turbo-alternator, to be installed at the Wilge power station, 5,100 ft above sea level. This is the station for the construction of which a loan has just been granted by the U.S. Export-Import Bank. There is, as yet, no indication of which firm is to supply the associated boiler plant.

Hirakud Project

The Government of the State of Orissa intends to use the possibilities of the Hirakud Dam project to the full, according to a recent statement by the Chief Minister. He declared that a preliminary survey on the use of electrical energy from the project had been completed and that a capacity of 200,000 kW would become available when the main dam was finished. An aluminium plant to be built near Hirakud would require 50,000 kW while a manganese plant would need 100,000 kW, he said. Raw materials for these industries were abundant in Orissa, and industrialists were anxious to start operations as soon as power became available, the Minister added. The Hirakud project has been under joint consideration by the Governments of India and of Orissa for some time. It was recently stated that the latest estimates for both stages of the scheme, subject to certain modifications suggested by an Advisory Committee, amounted to Rs.860·9 million.

Cable Works in Pakistan

A new concern has been formed in Pakistan for the manufacture of cables of all kinds. Its title is Pakistan Cables, Ltd., with initial shareholders including Telcon (Pakistan), Ltd. (a subsidiary of T. C. and M., Ltd.), Johnson and Phillips, Ltd. and British Insulated Callender's Cables, Ltd. The three English concerns, led by B.I.C.C., will act as technical and production advisers, it is stated. At the commencement, production is to be confined to conductor wire and strand, and rubber and p.v.c. cables for lighting and power, but it is likely that the range will be extended in due course to include a number of other types as the demand justifies.

N.Z. Wants Consultants

The services of overseas consulting engineers are to be sought by the New Zealand State Hydro-Electric Department in connection with the plan to erect a 100 MW steam generating station on North Island (as reported on this page, June 26 issue). From other reports it seems that the most probable site for the new station is on the Maramarua coalfield, near Huntly, where coal reserves of about 6,500,000 tons have been shown by surveys. But the total reserves of coal in that area are estimated at about 21 million tons. It has been emphasised that this decision to erect a new coal-fired station does not mean that the N.Z. Government and power authorities are pessimistic about the prospects of using geo-thermal power. On the contrary the experiments which have been proceeding for some time are making encouraging progress, it is reported.

Progress at Wairakei

Drilling will soon start at Wairakei Geyser Valley to see whether a 20,000 kW commercial geo-thermal generating plant can be set up there as an initial development. The first of three drills from America was due at Auckland earlier this month. It is hoped that within a year it will have been ascertained whether there is sufficient steam to set up a commercial power plant.

Power Outlook

Some restrictions on power consumption on North Island, New Zealand, will be necessary for the next 12 years, according to data presented at a meeting of Mr. Goosman with members of the Electrical Supply Authorities' Association and of the Electric Supply Authority Engineers' Institute. From this, it is estimated that the increase in power load will have to be kept down to 7½% annually until at least 1958, while in years of low rainfall, the restrictions will have to be even more serious. Reviewing the works in hand and those planned Mr. Goosman said the Government proposed to make an all-out effort to expedite the hydro stations at Wahakamaru, Waipapa, Atiamuri and Ohakuri. But from the latest information it seems that some of these stations are behind schedule. The Whakamaru station, for instance, is not expected to be running until after the winter of 1955 instead of before it, according to reports. The Ohakuri station, announced until recently as likely to be completed by 1956-7, may be as much as two years late.

PERSONALITIES

IN THE INDUSTRY

The appointment is announced of **Mr. G. B. Proctor,** B.SC.Tech.(Hons.), A.M.I.E.E., as managing director to Transformers and Welders, Ltd. Since 1944, Mr. Proctor was transformer sales manager to Ferranti, Ltd., with whom he has been since 1929. He is a member of many B. E. A. M. A. and B.E.A.-B.E.A.M.A. committees dealing with transformers and is vice-chairman of the B.E.A.-B.E.A.M.A. No. 2 Committee (Transformer Standardisation) which has recently made such an important contribution to the Transformer industry.

Mr. G. B. Proctor

Dr. W. I. Pumphrey, M.SC., Ph.D., F.R.S.A., manager of the Research Department of Murex Welding Processes, Ltd., has been made a Freeman of the City of London and a Liveryman of the Worshipful Company of Blacksmiths.

Mr. C. R. King, president of the Electrical Industries Benevolent Association, and chairman of the East Midlands Electricity Board, with Mrs. King, at the invitation of Her Majesty Queen Elizabeth II, attended the first Royal Garden Party last Thursday, in recognition of their services to the E.I.B.A. Other guests at that event included **Mr. N. C. Robertson,** M.B.E., director general of electronics, Ministry of Supply, and deputy managing director of E. K. Cole, Ltd., who was accompanied by **Mrs. Robertson.**

It is now announced that **Mr. P. V. Hunter,** C.B.E., HON. M.I.E.E., F.Amer.I.E.E., is resigning as deputy chairman of British Insulated Callender's Cables, Ltd., but is continuing as a non-executive director of the company. Mr. Hunter joined the former Callender's Cable and Construction Co., Ltd. in 1919 as joint manager and chief engineer. In 1938 he was appointed as a director, and after the formation of B.I.C.C. in 1945, became an executive director and engineer - in - chief. Mr. Hunter's resignation takes effect as from August 31. At that date he will be in his 70th year. At the request of the company he remains on the boards of several of the subsidiaries.

Mr. P. V. Hunter

Newly-elected president of the Association of Managerial and Electrical Executive is **Mr. G. J. Moody,** M.I.E.E., manager of the Northern sub-area of the London Electricity Board. At the annual meeting recently, the retiring president, **Mr. A. E. Morgan,** B.SC.(Tech.), M.I.E.E., A.M.I.Mech.E., made a presentation to the honorary treasurer of the Association, **Major E. A. Barker,** who was retiring after 23 years' service in that office. Mr. Moody also made a similar presentation to Mr. Morgan in recognition of the latter's services to the Association as honorary secretary during the difficult years since vesting day, a position he has now relinquished.

Mr. George B. Young, assistant information officer with the North of Scotland Hydro-Electric Board, has been appointed London secretary to the Scottish Council (Development and Industry) in succession to **Mr. A. MacNeill Weir.**

Until recently chief electrical and mechanical engineer to the Government of Cyrenaica, Libya, **Mr. T. G. Martin,** T.D., M.I.E.E., Assoc.I.Mech.E., has now joined the Kuwait Oil Co. as senior electrical and mechanical engineer. Mr. Martin's principal tasks in Libya have been concerned with rehabilitation of water and electricity supplies in war-damaged territory. He had similar experience in 1944 and 1945 as major O.C. with the 21st Army Group Power Company. Prior to the war he was successively with Etchells, Congdon and Muir Ltd., Evans Lifts Ltd., as consumers engineer with Central London Electricity, and as sales manager to Gresham Transformers.

Mr. T. G. Martin

Mr. John Bagnall and **Mr. T. C. Cameron Cooper,** who for the last six years have been directors of Colston Electrical Co., Ltd., of Bristol, have both joined another local firm, Godwin, Warren and Co., Ltd., as directors, in charge of a new engineering department, we understand. It is also learned that the former works manager of Colston Electrical Co., **Mr. R. Carryatt,** has also joined the Godwin Warren concern as production manager.

Westinghouse Brake and Signal Co. Ltd. announce that **Mr. F. A. Callaby** has been appointed financial controller of the company. He will be directly responsible to the managing director.

Chosen to lead the British Ladies' High Board (10 metres) diving team at Helsinki is **Diana Spencer**, age 18 years, the daughter of Mr. C. Spencer, assistant works manager, G.E.C. of India (Mfg.), Ltd., Calcutta. Diana, a good swimmer for years, distinguished herself in Western India before she was 12 but has only recently taken up serious training in diving. Last month she won the Middlesex Ladies' High Board Diving competition.

Diana Spencer

Yesterday, July 16, was a great day for **Mr. F. Pooley**, M.I.E.E., chairman of Pooley and Austin, Ltd., for he and Mrs. Pooley celebrated their golden wedding. His numerous friends in the industry will join in offering congratulations and wishing the happy couple continued good health.

Ferranti, Ltd., announce a change in their radio and television representation in South Wales, Herefordshire and Gloucestershire. Mr. C. Tillotson, formerly on the staff of the firm's London Service Department, replaces **Mr. C. J. Howard,** who has resigned from the company. For the time being, Mr. Tillotson may be contacted through the Radio Sales Department at Moston, Manchester 10.

The new district engineer at Johnstone for the South West Scotland Electricity Board is **Mr. J. U. Harvey,** who was previously first assistant district engineer there. He succeeds **Mr. T. Watson** who has retired. Prior to vesting day, Mr. Harvey was on the engineering staff of the Clyde Valley Electrical Power Co. **Mr. A. Guthrie,** first assistant engineer, Dumfries district, has gone farther north to become Mr. Harvey's first assistant at Johnstone.

Until recently engineer-in-charge at Stuart Street power station, Manchester, North Western Division, B.E.A., **Mr. R. Mills** has been appointed to a similar post at the Uskmouth power station, South Wales Division, B.E.A.

After serving the British Thomson-Houston Co., Ltd., for some 44 years, **Mr. A. G. Salisbury** retires from the motor engineering department at the end of this month. Mr. Salisbury pioneered the design development of fractional horsepower motors at B.T.H. Coventry Works, and in 1932 was appointed engineer-in-charge of their expanding development when the design-engineering work was transferred to Rugby. He received early technical training at the Merchant Venturers' Technical College, Bristol, being awarded an electrical engineering diploma, and joined B.T.H. as a special apprentice in 1904, working in the meter department, Rugby, of which he became chief draughtsman when the department was transferred to Coventry in 1912. His work later extended to car and aero magneto design when the latter were in active development during the first world war. From 1919 to 1923, he was with Vickers, Ltd., on similar work, but returned to B.T.H., Coventry, as design engineer in charge of magnetos and motor cycle and car lighting, before starting his pioneering work on f.h.p. motor design. This work brought him into a wide circle of engineering activities in which he made many friends, all of whom wish him every happiness in a well-earned retirement.

Mr. A. G. Salisbury

Mr. W. M. Widgery, F.R.Ae.S., has been appointed technical director of Normalair, Ltd., and **Mr. N. H. Payne,** B.Sc., M.I.Mech.E., is joining the company as chief engineer next month.

Mr. P. D. Burnham has been appointed assistant shift charge engineer at Huncoat power station, North Western Division, B.E.A.

Mr. Walter Stevens, whose five-year term of office as general secretary of the Electrical Trades Union was due to end in December next, has been re-elected unopposed to that post for a further five years. This was announced at the union's Rules Revision Conference which ended at Whitley Bay last Friday.

I.E.E. COUNCIL AND COMMITTEES

THE Institution of Electrical Engineers has now announced the constitution of the Council, the various sections, committees, and the names of the chairmen of local centres for the session commencing September 30, next.

President: *Colonel B. H. Leeson,* O.B.E., T.D., M.I.E.E., director of B.E.A.M.A.

Vice-Presidents: *H. Bishop,* C.B.E., B.Sc.(Eng.), M.I.E.E., M.I.Mech.E., who takes over from Sir Noel Ashbridge on August 1, as director of technical services, B.B.C.; *J. Eccles,* C.B.E., B.Sc., M.Inst.C.E., M.I.E.E., M.I.Mech.E., chairman, Merseyside and North Wales Electricity Board; *T.E.Goldup,* M.I.E.E., director, Mullard Ltd.; *Sir George H. Nelson,* F.C.G.I., M.I.Mech.E., M.I.E.E., chairman and managing director, English Electric Co., and *W. G. Radley,* C.B.E., B.Sc.(Eng.), Ph.D., M.I.E.E., deputy chief engineer and controller of research of the Post Office Engineering Department.

Honorary Treasurer: *H. W. Grimmitt,* M.I.E.E., A.M.I.Mech.E., deputy chief engineering inspector, Ministry of Fuel and Power.

Ordinary Members of Council: *T. E. Allibone,* D.Sc., Ph.D., F.R.S.; *C. Dannatt,* O.B.E., D.Sc.; *Prof.*

B. Hague, D.Sc., Ph.D.; *O. W. Humphreys*, B.Sc.; *J. O. Knowles*, M.A.; *Sir Hamish D. MacLaren*, K.B.E., C.B., D.F.C. B.Sc.; *B. L. Metcalfe*, B.Sc.(Eng.), *J. L. Miller*, D.Eng., Ph.D., *R. W. Mountain*, B.Sc.(Eng.); *A. H. Mumford*, O.B.E., B.Sc.(Eng.); *Prof. M. G. Say*, Ph.D., M.Sc.; *D. P. Sayers*, B.Sc., *C. E. Strong*, O.B.E., B.A.I., and *Prof. F. C. Williams*, O.B.E., D.Sc., D.Phil., F.R.S.

Associate Members : *J. F. Bird*, M.C., T.D., B.Sc.; *H. R. L. Lamont*, Ph.D., M.A., B.Sc.; *G. Lyon*, M.Sc. (Eng.), and *R. A. Smith*, M.A., Ph.D.

Companion : *C. R. King*, chairman, East Midlands Electricity Board.

Associate : *S. L. M. Barlow*, managing director, Barlow and Young, Ltd.

The new **Chairmen of the Sections** are: *C. M. Cock*, M.I.Mech.E., M.I.E.E., M.I.Loco.E., (Supply); *L. Hartshorn*, D.Sc., A.R.C.S., M.I.E.E. (Measurements); *E. C. S. Megaw*, M.B.E. D.Sc., B.Sc. (Radio); and *J. W. T. Walsh*, O.B.E., D.Sc., M.A. (Utilisation).

Chairmen of the Local Centres: *W. A. Hatch*, M.B.E. (Mersey and N. Wales); *Major H. E. Knight* (East Midland); *H. Leyburn*, B.Sc.(Eng.) (North Eastern); *H. S. Moody*, B.Sc.(Eng.) (North Midland); *J. S. A. Primrose* (Scottish); *J. Prince* (North Western); *K. R. Sturley*, Ph.D., B.Sc. (South Midland); *Cdr. (L.) J. C. Turnbull*, R.N. (Southern); *A. C. Warren*, B.Sc. (Western); *H. Weston* (Northern Ireland).

The Measurements Section Committee is constituted as follows: chairman, *L. Hartshorn*, D.Sc.; vice-chairman, *M. Whitehead*; Members, *G. W. B. Mitchell*, B.A., and *R. H. Tizard*, B.A.

The Radio Section Committee is constituted as follows: chairman, *E. C. S. Megaw*, M.B.E., D.Sc.; vice-chairman, *C. W Oatley*, M.A., M.Sc.; members, *N. R. Bligh*, B.Sc.(Eng.); *J. H. H. Merriman*, M.Sc.; *Brig. E. J. H. Moppett*; *A. R. A. Rendall*, Ph.D., B.Sc., and *J. A. Saxton*, Ph.D., B.Sc. The committee have also co-opted *Mr. G. G. Macfarlane* B.Sc., to fill the casual vacancy caused by the election of Mr. C. W. Oatley as vice-chairman before the completion of his term of office as an ordinary member of the committee.

The Supply Section Committee is to be composed of: chairman, *C. M. Cock*; vice-chairmen, *L. Drucquer* and *J. D. Peattie*, B.Sc. Members: *B. Adkins*, M.A.; *L. D. Anscombe*, M.A. and *J. S. Forrest*, M.A., D.Sc. The committee have co-opted *Mr. G. N. Green* to fill the casual vacancy created by the election of Mr. L. Drucquer as vice-chairman before the completion of his term of office as an ordinary member of the committee.

The Utilisation Section Committee is constituted as follows: chairman, *J. W. T. Walsh*, O.B.E., M.A., D.Sc.; vice-chairman, *J. I. Bernard*, B.Sc. (Tech.); members, *M W. Humphrey Davies*, M.Sc., *D. B. Hogg*, M.B.E., *E. Mead*, B.Sc.(Eng.) and *G. V. Sadler*.

Safety in Mines

RECENTLY published is the 29th Report on Safety in Mines Research for the year 1950. Much of the information contained in this report has already been published in the form of papers, but in view of the rapidly increasing use of electricity and machinery in pits, the sections dealing with work in this field are of considerable interest.

Lighting

Large scale experiments on the use of fluorescent tubes for longwall face lighting are being conducted by the N.C.B. mainly to test the suitability of the design of fitting and to discover the spacing required for adequate illumination. The maintenance of the system, lamp replacement, and economic and safety problems are also being checked. Hot cathode tubes, ranging in output from 15 to 40 watts are being used, and firms are engaged in development of "cold-start" devices to prevent any possibility of gas ignition in the event of a tube breaking.

A further idea for safety is a device for preventing large or dangerous currents being drawn from headpiece or cable of a cap lamp.

Work has also been carried out on the effects and pressure waves induced by an explosion within the casing of a core-cooled electric motor.

Intrinsic safety has received much attention and over 300 items of electrical equipment for use in mines have been certified as safe.

The use of X-ray equipment for non-destructive flaw detection has been largely superseded by the utilisation of radio active isotopes, although magnetic methods using suitable inks are frequently adopted.

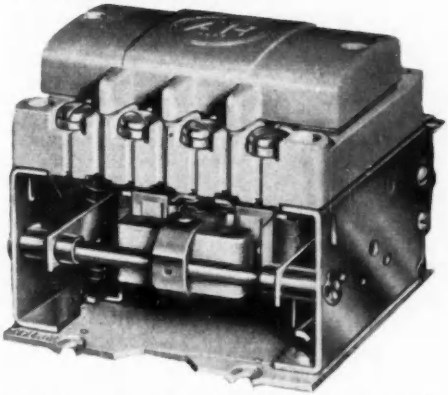
On the question of flame-proof testing, the report mentions a considerable increase in the number of applications for type-testing, but owing to staff difficulties a two months backlog built up. In addition to the standard equipment submitted were a recording meter unit containing ammeter, voltmeter and wattmeter for insertion in a run of cable, motors and control gear for a self-propelled drifting drill, and several motors and switch units. Five of the motors were totally enclosed and satisfactorily passed the tests. The report concludes with a series of synopses of research reports and published papers.

The BUYER'S *Column*

American Type Contactors

ARROW ELECTRIC SWITCHES, of Hanger Lane, Ealing, London W.5, announce that they are now in production with a new range of contactor gear to the latest designs of their American associate company. Much time and money has been spent in the U.S. in developing this gear. Many exclusive features are embodied, not the least of which is the reduced size, effecting a 50% saving over conventional types.

The range comprises contactors having ratings of 25, 50 or 100 amperes and can be supplied with or without enclosures.



Type RA, one of the new American type contactors by Arrow

Thermionic Valve Retainers

VIBRATION can easily dislodge valves, especially miniature and special types used in Service and industrial equipment, and hence some retaining method is needed. Retainers comprised essentially of a spring loaded, top harness of glass fabric cords have already been put into extensive use. A new show card, containing some dozen samples of their product is being sent to radio manufacturers throughout the country by ELECTROTHERMAL ENGINEERING LTD., 270 Neville Road, London E.7, and will prove of value to radio and electronic engineers, enabling them to choose the most suitable retainer for any particular application.

Cupro-Nickel Alloys

ADMIRALTY quality 70/30 cupro-nickel has been added by the Metals Division of I.C.I. to the "Kunifer" range of cupro-nickel alloys containing inclusions of iron and manganese.

Originally the trade name "Kunifer" referred to alloys having 5% and 10% nickel content, but as the Division's well-known" AE Super-nickel" condenser tube alloy has for many years contained inclusions of iron and manganese, it has been thought wise to bring it into the "Kunifer" range. The nickel content will be distinguished by numerical suffixes. Thus "Kunifer 5" contains 5% nickel; "Kunifer 10" contains 10% nickel, and "Kunifer 30" is the new name for the Admiralty quality.

Hearing the Visitor

A NEW combined bell and buzzer set, the "Majotwin" has been produced by V. AND E. FRIEDLAND, LTD., of Macclesfield. This is suitable for front and back door signals in the home, and its two easily distinguishable sounds make it ideal for factory and office use. As the two units are combined, the overall cost is considerably less than that required for two separate components. Retailing at 12s. 6d., the "Majotwin" is available through leading wholesalers.

Cutting of Lengths

FOR repetition cutting of lengths of reeled or strip material is a machine manufactured by E. W. COWELL, 7a, Sydney Rd., Watford, Herts. The machine operates by feeding the material

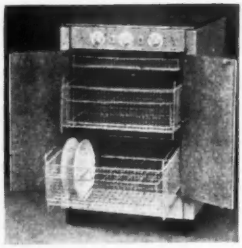
The Majotwin gives warning of callers at both back and front doors

through intermittent running rollers. When the rollers are at a halt, shearing cutters sever the material. By varying the amount of rotation of the rollers the length of the cut piece is also altered. The machine is made in three types. Type "A" cuts up to 24 in. Type "B" up to 12 in. and Type "C" to 1½ in. Maximum width of fed material is 4 in., and production rates are: "A" 3,300 cuts/hr (12 to 24 in.); "B" 6,600 cuts for strips up to 12 in.; "C" 20,000/hr up to 1½ in.

Sterilising in Hospitals

A CROCKERY sterilising hot cupboard has recently been produced for hospitals by the ARORA CO., Rosebery Street, Loughborough.

This is a modified version of the 2 ft hot cupboard having bottom heating only, 2 kW loading, thermostatically controlled with a cooker thermostat. The cupboard is provided with three heavy gauge galvanised steel wire baskets. It is supplied in stoved enamel cream, white or aluminium colour and where necessary in vitreous enamel finish, the top being chromium plated steel. If for convenience purposes casters are required these can be fitted. The internal dimensions are approximately 24 in. high by 20 in. wide by 24 in. deep.



Fall in Refrigerator Prices

RECENT reports state that KELVINATOR LTD., Crewe, Cheshire, in order to maintain production and employment at their plant have announced certain reductions in the prices of their domestic refrigerators.

One model has been reduced from 105 to 98 guineas whilst another is now priced 122 guineas —a reduction of £17 17s.

TRADE PUBLICATIONS

MINE SIGNALLING.—Type 48 signalling systems for endless rope man-riding haulage systems are described in a brochure by Automatic Telephone and Electric Co. Ltd., Strowger Works, Liverpool.

MOULDING MATERIALS.—From Bakelite Ltd., 18 Grosvenor Gardens, London S.W.1, we have received a copy of the second edition of "Types and Grades of Bakelite Phenolic Moulding Materials." This now includes details of new materials introduced in the past five years.

DIESEL ENGINE INDICATOR.—A recent publication issued by Standard Telephones and Cables Ltd. gives details of the new Standard-Sunbury Electronic Engine Indicator Type F. This is used in association with magnetic pick-ups to indicate cylinder pressure in diesel engines. The indicator may be used with other pick-ups to measure vibration, fuel-line pressure and spray-valve lift.

LAMP PRICES.—New price lists have been issued covering the extensive range of lamps manufactured by British Lumo Co-operative Electric Lamp Society Ltd., Hardgate Road, Glasgow S.W.1.

RECTIFICATION.—Elegant in appearance and comprehensive in scope is publication M.R.1, dealing with the use and application of Westinghouse copper-oxide and Westalite rectifiers. This is produced by the Westinghouse Brake and Signal Co. Ltd., 82 York Way, King's Cross, London N.1.

SWITCHGEAR.—Details and test certificates of the G.M. oil circuit-breakers are contained in leaflet OCB.971, and particulars of G.M. metal-clad switchgear (air-break and oil-break), together with mountings, cable entries and busbars, are included in leaflet SB.971. The first of these publications deals with o.c.b.s for use on a.c. supply up to 440 V, and the breakers are designed to comply with BSS.936/40. Copies are available on application to G.M. Engineering (Ottery St. Mary) Ltd., 1 Victoria Street, London S.W.1.

ELECTRICAL ACCESSORIES.—The second edition of Catalogue No. 492, dealing with conduit, conduit fittings and tools, iron-clad switch units, sockets and switch sockets, is now available from Alliance Wholesale Ltd. (and Simpson Baker and Co. Ltd.), 24-30 Gillingham Street, London S.W.1.

"PAGING THE WORKS MANAGER" is the title of a leaflet No. 1186 issued by Communication Systems Ltd., Strowger House, 8 Arundel Street, London W.C.2. This deals with A.T.M. sound systems for staff location, general announcements, "Music While You Work" and other general requirements.

CABLES.—Current cable leaflets issued by the Sterling Cable Co. Ltd., Aldermaston, Berks, include "Aluplas"—a product with aluminium conductors and plastic insulation; "Shipwiring" special cables; "American" standard aluminium cables; and "British" and "Continental" standard aluminium conductors.

SAFETY SWITCHING.—Tumbler-operated switches, including mercury break units, are described in Catalogue Ref. F.13 issued by the Wandsworth Electrical Manufacturing Co. Ltd., 308a Station Road, Harrow, Middlesex. These switches are designed for use in explosive gas hazards in such places as hospitals, and meet the Ministry of Health requirements.

SMALL PRIME MOVERS.—Latest addition to the range of Villiers stationary four-stroke engines is the Mark 40 4 h.p. unit, which can run on petrol, or, with a specially designed vaporiser, on vaporising oil or paraffin. A specification leaflet, giving all external dimensions, power and torque curves, is available from Villiers Engineering Co., Wolverhampton.

NEW LITERATURE

Television Principles and Practice

by F. J. Camm

IT is considered by some, among whom may be found the author of this book, that the television viewer in order that he may operate his receiver intelligently, should be aware of the general principles involved, with perhaps a limited knowledge of their practical applications. Whether this knowledge will tempt such viewers to tamper with receivers, with possible injury to both, is another matter, the point being that the author has succeeded in his attempt to present this subject on a general non-technical basis.

Anyone conversant with the meaning of general electrical terms and graphical symbols will romp through most of this book, which covers the whole sphere of television from a description of a B.B.C. studio layout; through a simplified explanation of a television receiver and winding up with a review of the Beveridge Report. Within this wide span, a nodding acquaintance is made with servicing and colour and stereoscopic presentation, and a television dictionary is thrown in for good measure. Circuit diagrams are used only where necessary, and a liberal admixture of photographs and illustrations add to the attractiveness of this book. Published by Geo. Newnes, 215 pages, 8½ in. by 5½ in. Price 25s.

Modern Lighting Technique

by H. Hewitt, A.M.I.E.E.

ILLUMINATING engineers, electrical contractors, architects and builders, and maintenance engineers responsible for lighting public thoroughfares, for all of whom this book is primarily intended, are always striving towards the ideal lighting installation. To aspire to that ideal it is necessary to have a thorough and up-to-date knowledge of the numerous aspects of the task in hand. There are the fundamentals, or essential qualities of good illumination; the types of lamps and fittings available; the recognition of problems to be surmounted; and finally the ability to adapt knowledge to prevailing circumstances. These are all important factors in preparing a satisfactory lighting scheme, and essential points in the attainment of the ideal.

Thus the above subjects were chosen as a syllabus by Mr. Hewitt, part-time lecturer in illuminating engineering at Manchester Municipal College of Technology, and lighting specialist to the N.W. Electricity Board, and assembled to form this volume. Following the course of instruction and advice given by Mr. Hewitt, the aspirant to the ideal lighting scheme will go far along the road to fulfilment. Mention of roads brings one to the book's final chapter on street lighting—an important branch of the service of illumination today. Published by Edward Arnold and Co., 215 pages, 8¾ in. by 5½ in. Price 21s.

Introduction to Electronic Circuits

by R. Feinberg

CONCENTRATION on the mathematical approach to the subject of electronics which is the method used by the author, makes this book eminently suitable for undergraduates. The standard is high—second order differential equations and Fourier's expansion series—and the more practical student may encounter heavy going. Treatment throughout is comprehensive and thorough and there is little doubt that this book will be a valuable addition to the electronic student's book shelf.

The principles of thermionic valve operation and application receive thorough treatment, and although laboratory experience is advantageous, notes on experiments to be conducted in this connection and numerical examples are provided. In logical sequence, exposition of the theory and fundamental practice of a.c. amplification is included, with emphasis on the effects of non-linear value characteristics. Recognising the important part played by oscillators in electronic engineering, a lengthy discussion on sinusoidal and relaxation oscillator circuits forms the major part of the book, outlining the operation of the electronic switch. Published by Longman's Green and Co, 163 pages, 8½ in. by 5½ in. Price 18s.

Power System Analysis

by J. R. Mortlock, Ph.D., B.Sc.(Eng.), M.I.E.E. *and M. W. Humphrey Davies*, M.Sc., A.M.I.E.E.

IN its essentials this valuable book is a record of a postgraduate course on power system analysis which was held at Imperial College three years ago. The authors have not been content, however, merely to reproduce what was said: they have recast the original information in a largely successful attempt to ensure clarity while avoiding a disturbing difference of treatment between the various sections of the book. The volume has been avowedly prepared for those who have had some experience of power system work, and the approach adopted has been to provide an introduction to more specialised publications. Because of the clearness of presentation already mentioned, however, there is much of value for the engineer coming fresh to the subject.

In its early chapters, the book discusses a.c. circuits and conventions, the practical solution of simple networks, and the methods of symmetrical components. The characteristics from the system analysis of the various elements met with in a network are then dealt with, and the later chapters cover such special problems as stability, systematic computation, the application of matrices and system design. Published by Chapman and Hall, 348 pages, 8¾ in. by 5¾ in. Price 45s.

The WEEK in NEWS

Southern Board Latest to Raise Tariffs

Increases to Minimise Expected Deficit This Year

TO meet financial burdens which have increased costs by approximately £1,500,000 per annum, the Southern Electricity Board has decided to make changes to its tariffs. As from October 1 next, under the standard domestic tariff (which was introduced last October), the primary rates of 5d. per unit (6d. for prepayment supplies) are being increased to 5½d. and 6½d. respectively, and the secondary charge of ¾d. p.u. is to be raised to 1d. p.u. The Board has also decided to increase the total revenue derived from all supplies to commercial and farming premises by approximately 12½% concurrently with the introduction of standard commercial and farming tariffs as from April 1 next.

The Board's standard domestic tariff, introduced last October, was designed to—and does in fact—bring in approximately the same revenue as the 125 tariffs it replaced. But despite other economies, the substantial rise in costs has made it necessary for the Board to increase tariffs as soon as possible to minimise the deficit expected in the current year, and to effect a small trading surplus for 1953-54.

When considering the Board's proposals the area consultative council suggested a reduction in the number of units chargeable at the primary rate for both the smallest and largest houses. This the Board rejected, but agreed to review all standard tariffs in the light of experience.

RADIO EQUIPMENT FOR N.A.T.O. AIRCRAFT

IT was announced last week that a large contract for radio equipment has been placed with Thorn Electrical Industries Ltd., by the U.S. Government. The order was stated to be worth $2½ million. It will mean employment for British technicians on vital dollar-earning work in the Ferguson factories. The apparatus will be used in N.A.T.O. aircraft.

Australian Order for Power Plant

THE Commonwealth of Australia's Department of Works and Housing has recently placed an order with the Melbourne branch of the English Electric Co., Ltd., for the supply of diesel generating plant. The plant will have an aggregate output of over 15,000 b.h.p. Prime movers of the S.V. and S.R.K. range of engines, together with the company's alternators and station accessories, are destined to provide power for factories in Victoria and New South Wales.

B.E.A. APPROVES CHANNEL GRID

FURTHER to our account last week concerning the interim report of the Joint Technical Committee, comprising representatives of the B.E.A. and Electricité de France, on the proposed cross-channel submarine cable, it has been stated officially by the B.E.A. that they have approved the report in principle. The B.E.A. has adopted the recommendation to undertake a development programme and has accordingly authorised an expenditure of £125,000 for that purpose. It is presumed that Electricité de France will take similar steps.

COPPER PRICE STEADY

IT was announced by the Ministry of Materials last week that arrangements with Commonwealth suppliers had been completed and the present copper price would continue throughout July. The selling price of £287 per ton can therefore be regarded as stable at least until the end of the month.

The First Half-Century

Of decided interest to electrical engineers as well as to colliery owners and managers at the Wolverhampton Exhibition was an electric bar coal cutter. The motor attached to the coal cutting bar is, of course, strictly enclosed, gas-tight, dustproof, and able to withstand the roughest handling, in fact, it may be said to be armour clad, its shell being of cast steel; and needless to say the whole apparatus is of special design and construction, both for coal cutting and its practicable adaptability for use in a coal mine. Up to now mechanical coal cutting machines have made comparatively small progress in this country, but with the advent of a well-designed and strongly-constructed enclosed electric motor, and its adoption for driving a good rotating bar cutter, there should be every inducement to introduce machine cutting into our mines, since it not only reduces the cost of coal-getting by greatly increasing output per man, but the coal got is "rounder" and the proportion of "slack" much less.—*From our issue of July* 17, 1902.

National Assistance for Street Lighting?

AN appeal for better street lighting throughout the country is one of the recommendations advanced by the Committee on Road Safety, which under the chairmanship of Mr. J. G. Braithwaite, Parliamentary Secretary to the Ministry of Transport, issued its report on the Gillingham bus accident last week. The committee were of the opinion that had the road been properly lighted the accident would not have occurred.

While appreciating that the provision of adequate street lighting could proceed only slowly in existing circumstances, the report states a suitable standard of such lighting throughout the country was of great importance. The committee accordingly recommended that improvements to street lighting should be given special attention, and that local authorities should, if necessary, receive assistance from central funds. It was, however, a long-term policy, and in the meantime action should be taken to encourage local authorities to give priority to schemes for improving very bad lighting.

It was also recommended that local authorities be reminded of the importance of maintaining lighting systems in a satisfactory condition.

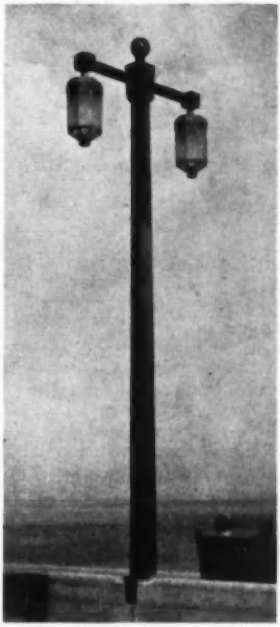
A.M.E.E. URGES SALARY INCREASE

THE progress of negotiations on the N.J.M.C. (4th leg) since the signing of the agreement last year, was dealt with by Mr. A. E. Morgan, retiring president of the Association of Managerial Electrical Executive, at the recent annual meeting. There had been joint meetings with the Authority who had promised to table salary scales as soon as possible, he said. On the staff side the three unions (A.M.E.E., E.P.E.A. and N.A.L.G.O.) had pressed for an interim increase on the provisional salaries of grades to be covered by the agreement, because of the altered conditions since vesting day. The B.E.A. had made certain offers in this respect, subject to a salary ceiling of £2,000 p.a., which the staff side would not accept.

Mr. Morgan also stated that some 32 compensation awards totalling about £3,000 p.a. to members had been received, and a test case in respect of municipal engineers not paid under the 1941 scale was anticipated at an early date. Membership of the Association continued to increase and now numbered 653, including associates and companions. The new president is Mr. G. J. Moody, M.I.E.E.

All Street Lighting by Electricity ?

BECAUSE of wastage from gas leakages due to the light going out or burst pipes, local authorities are now being advised to replace gas lamps by electricity. This was stated at a recent meeting of the N. Western Gas Consultative Council when a resolution that gas used for street lighting should be charged on a block tariff rate was disapproved. It was emphasised that leakages could not be prevented and consequently the use of gas was invariably uneconomical. The chairman, Cllr. C. E. P. Stott, pointed out that it was the Gas Board's policy to recommend to local authorities a transference from gas to electricity.



One of the 20-ft. timber lamp standards made of iroko, a West African form of teak, which have been erected at Sidmouth recently. They were designed by Mr. L. M. Blanchard, Sidmouth's surveyor, in collaboration with the Timber Development Corporation, and formed a prominent exhibit at this year's Royal Show. The standards were, in fact, made at Newton Abbot. Costing about £85—rather more than the usual metal lamp standard — the wooden column is said to be comparatively non-corrodable, making for low maintenance costs

ELECTRONICS IN TELEPHONE EXCHANGES

THE development of electronic techniques and their application to the construction of such articles as computors and electronic brains have led Post Office engineers at their Dollis Hill research station to study their possible uses in automatic telephone exchanges. The object is to provide telephone exchanges operated entirely by electronic means instead of the present type of electro-mechanical switch.

Experiments along these lines are now being carried out at Richmond, where there are now six electronic directors—the apparatus which responds to the three initial letters dialled. One such director is good for about half a million calls a year, and has the advantages of instantaneous operation, no moving parts, less expensive in installation and ease in maintenance. This electronic system at Richmond is believed to be the first of its kind in the world. Many research problems and practical difficulties still remain to be solved, however, and it will probably be some years before the idea can be developed fully.

Coal Council deals with Price Structure

THAT the prices of coals should be relative to heat values rather than that the device of illogical "flat rate" increases should continue to operate, was one of the views expressed in the annual report of the Industrial Coal Consumers' Council for the year ending June 30, recently issued. A similar report of the Domestic Coal Consumers' Council was published at the same time.

The report deals at some length with the last stage in the N.C.B.'s rationalisation of prices which was the new price structure introduced last December to coincide with price increases. Coals used for industrial or carbonisation purposes were placed into appropriate categories according to their considered primary uses. The value of each coal was assessed by means of formulæ covering its main characteristics. For industrial coal it was based mainly on the heat content as measured by the gross calorific value "as received." It was recognised, however, that high ash content was a nuisance and ash penalties which reduced prices as the ash content rose were introduced. Coals of rank 602 were valued approximately the same. Adjustments were then made in respect of characteristics of commercial significance not covered by the formulae. The calculation of group prices resulted in the same price for similar qualities in different coalfields, so different amounts were added to group prices for the various coalfields. The Council considered some such method was inescapable if there were to be a rational price structure. When it was further developed consumers would be able to judge whether or not it would pay to have particular grades cleaned, bearing in mind transportation costs of unnecessary ash.

The broad specifications of coals in particular price groups have been made available to consumers, but it is recommended that if coal consistently varies from the specification, consumers should contact the N.C.B. through their suppliers.

Germs Killed by Ultra-Violet Rays

WE hear this week of a new phase in the constant fight with germs which should prove valuable in numerous circumstances, such as doctors' waiting rooms, hospital wards, offices, shops and sundry other public places where germs are prevalent. The new development in ultra-violet mercury-vapour tube manufacture, by Philips Electrical Ltd., has facilitated the reproduction of the sun's germ-killing functions at a much lower cost. The tubes are similar to 15 W or 30 W fluorescent lamps and can be fitted into reflectors which throw the radiation upwards only. While this type of ultra-violet tube, which Philips now make of a special glass instead of quartz, emits germicidal radiation, it does not pass the rays which produce strong smelling ozone. The same or slightly higher ultra-violet radiation intensities can be used to protect food.

Its application in food shops should be popular, and we understand the tubes have already been introduced in Holland to protect shops' food displays.

OFFICIAL PUBLICATIONS

ELECTRICITY SUB-COMMITTEE OF JOINT CONSULTATIVE COMMITTEE. *Report on Load Spreading.* H.M.S.O. 4d.

COAL CONSUMERS' COUNCILS. *Reports of both Industrial and Domestic Councils for year ending June* 30, 1950 (*see this page*). H.M.S.O. 9d.

OVERSEAS ECONOMIC SURVEY. Guatemala. H.M.S.O. 1s.

MORE ALUMINIUM TO AID EXPORTS

LARGER quantities of virgin metal for direct and indirect export are to be made available to the aluminium industry according to a Government notification last week. This has been made possible by an increase in the collection of scrap and in Canadian output, but some call on reserves will have to be made. Main anxiety is to effect an increase in dollar sales, but the issue of special export licences will be considered if the conversion value falls below £220 a ton minimum. Emphasis has been laid on speed in expanding exports and this is regarded as the main object of the plan. Up to now the industry has been limited to about 80% of 1950 export rate except in special cases, such as dollar contracts.

A new 27 in. rectangular TV picture tube developed by Sylvania Electric Products Inc., New York. Now in pilot production, limited quantities are being shipped to receiver manufacturers for experiments. Limited production quantities are expected to be available in late summer. The tube is seen here in the hands of Roxanne, star of a C.B.S. TV show

NEW SCHOOL OF MATERIALS HANDLING

IT is significant that in recent months a number of steps have been taken to cope with the increased importance of mechanical handling. Prominent among those steps was the formation of the Institute of Material Handling, reported in our May 29 issue. There has, however, been a gap, hitherto, in this field due to the absence of suitable engineering studies, and the bridging of this gap has been the task of specialists over the past two years.

The committee stage of the work has been completed and it is now announced that a school of materials handling has been formed. The course has been divided into three groups, the third of which comprises general subjects including coal and ash handling. A number of other subjects in this group are being prepared. We note that a fourth group on power transmission is also in the course of preparation. A detailed syllabus on subjects for study may be had on application to the Secretary, School of Materials Handling, Camellia House, Blackheath Hill, S.E.10.

Move to Prevent Illicit Fishing by Electricity

SOME months ago we referred in these columns to the method of fishing by electricity. The apparatus concerned comprises, broadly, electrified poles which when lowered into the water temporarily stun the fish. We learn now that the Great Ouse River Board has decided to take suitable action for the drafting of a by-law to prohibit the use of the contrivance by unauthorised persons.

Used legitimately the apparatus was designed to clear streams for engineering and other work, or in the separation of coarse fish from salmon and trout. The fish are taken elsewhere and suffer no apparent after-effects. The Board has pointed out, however, that in the hands of poachers or other unauthorised persons the machine was capable of doing great damage.

Cocktail lounge and bar at U.S. Air Force Officers' Club at South Ruislip The aquarium bar can be seen in the centre of the picture

An Anglo-U.S. Lighting Scheme

AN unusual setting for a lighting installation, inasmuch as similar premises are seldom featured, was at the U.S. Air Force's new Officers' Club at South Ruislip (London), where American architects and British illuminating engineers co-operated to produce a really effective lighting scheme. The bulk of the fittings used in the dining messes, bar and cloakrooms, as well as heating and lighting equipment for an aquarium bar, were supplied by the G.E.C.

Methods used in the dining messes exemplifies a practice seldom used in this country, though prevalent in the States. Tungsten fittings in matt reflectors with circular aluminium louvres have been recessed in the ceiling. In the larger mess 42 fittings, specially designed, each housing a 100 W pearl lamp, have been arranged in staggered formation, while in the smaller (generals') mess 18 such fittings were used. They are arranged for switching in groups of three and five so that a uniform lighting pattern is obtained.

The cocktail bar is possibly the most attractive, the bar itself consisting of an aquarium in which there are 800 tropical fish. The complete bar is 20 ft long and 3 ft 6 in. deep. Eight 4 ft tubular heaters, operating at 100 V, have been employed and are controlled by thermostats which maintain a temperature of 78° F. Each can be removed separately. Illumination of the tanks has been provided by four sections of 4-lamp reflectors, each housing a 30 W 11 in. striplight lamp on a 50 V supply. Over the cocktail bar are two black rectangular canopies, on top of which eight Gecoray reflectors (each containing a 60 W lamp) have been mounted. These give an appropriate soft, mellow, indirect light.

Other fittings have been supplied for the kitchen and striplights for the hatchway and mirrors and dressing-tables in the cloakrooms. Electrical contractors were Read and Partners.

PETROL REPLACES TROLLEY BUSES NOW

FOLLOWING the complete replacement of trams in London and the partial changeover from trams to buses in Birmingham, it may be significant that a few of Doncaster's trolleybuses are to be scrapped early next year. They are to be replaced by 15 new petrol buses. The trolleybuses are some of the Corporation's oldest vehicles, and it has been pointed out that it is not yet intended to replace the trolleys altogether.

Easy cooking for the blind by means of the G.E.C. cooker control unit was demonstrated at the Food Fair. The telephone bells and relay seen in the photograph are normally housed behind the switch panel

New Cable Works in Northern Ireland

THE Wandleside Cable Works Ltd., a subsidiary of Falk Stadelmann and Co., Ltd., is to take over a new factory at Newcastle in Northern Ireland. It was announced by Mr. W. V. McCleery, N. Ireland's Minister of Commerce, that negotiations for the establishment of a manufacturing unit in Co. Down had been successfully concluded. Production of cables on these new premises will start at the earliest possible date.

This new factory is one of the advance factories being built by the Ministry in provincial centres. It covers some 18,000 sq ft, and when in full production is expected to provide employment for about 180 workers.

£1 m Yugoslav Contract

WE hear that a contract worth over £1 million has been placed by Yugoslavia with the General Electric Co. for a complete iron-ore handling plant. It was negotiated with Invest Import of Belgrade, the State trading organisation. The handling plant will form part of a complete iron-making plant.

NEWS IN BRIEF

Wanted in Sheffield area—storm watchers to benefit the Electricity Board and consumers. Their efforts, it is hoped, will lead to fewer faults in overhead cables during lightning storms. They are working all over the country but there are few around Sheffield apparently.

Chairman of S. Wales Electricity Board, Mr. L. Howles, recently opened a new social club for Board and Tir John power station employees at Heathfield.

Scunthorpe Old People's Welfare Committee is to ask the Y.E.B. for reduced electricity charges. They find it impossible for old-age pensioners to pay the present charges.

Sales of radio and T.V. sets declined again during May, according to latest R.T.R.A. index. Average number of radio sets sold per shop was 5·11, and T.V. sets 3·16, falls of 0·33 and 0·56 respectively over April.

Thirty-five students from Faraday House, London, visited the works of Electric Construction Co., Ltd., at Wolverhampton recently.

A new radiotelephone service, to be operated by Cable and Wireless, Ltd., between Jesselton, N. Borneo, and Singapore, has been opened.

London Transport has bought the escalator used in the Dome of Discovery. It will be installed at Alperton Station on the Piccadilly Line.

Over 300 parents and guests accepted invitations to B.T.H. Willesden Apprentice Association's annual Parents' Day. Senior apprentices conducted visitors around the factory.

The title of the National Association of Local Government Officers has been changed to the National and Local Government Officers Association. The short title NALGO will continue to be used.

Kerry's (Gt. Britain) Ltd., are to stage an exhibition of TV, radio and electrical equipment at the Burlington Hotel, Taunton, between August 19 and 21.

To provide even quicker service facilities to their TV subscribers, British Relay Wireless Ltd., have equipped their service transport fleet with walkie-talkie radio.

A Rand gold-mining centre, Nigel, 40 miles from Johannesburg, wants British industrialists to open new factories there.

A view of the new showrooms of Tricity Cookers, Ltd., in Kingsway, London, which is proving valuable in the development of Thorn Electrical Industries' domestic equipment division. The admirable new demonstration kitchen can be seen in the background

Questions in Parliament . . .

Delays in Delivery to S. Africa

It was asserted in the House on Thursday that a number of orders for equipment placed in this country had been cancelled by the S. African Minister of Transport because of long delays in delivery. Particular orders cited were for 40 electric units promised for early 1951, 15 electric motor coaches promised for November, 1950, and loco boilers promised for early 1950. Mr. P. Thorneycroft said he was aware of delays but not the particular instances given. He assured the House the matter was being examined with some urgency.

Industrial Basic Materials Prices

The President of the Board of Trade stated that the index number of wholesale prices of basic materials, other than fuel, for non-food manufacturing industry, declined by some 12% between October, 1951, and last month.

Electronics Industry in Scotland

Mr. D. Sandys told of progress being made in the development of the electronics industry in Scotland, last week. He said a detailed scheme had been prepared for a new laboratory block near Ferranti's works costing some £513,000. New building and ancillary services to a value of £205,000 had been authorised and machine tools valued at £102,000 had been allocated from Ministry stocks. Other equipment was on order. Mr. Sandys said he understood Ferranti were communicating with a number of firms who may be suitable associates, and one had already started work on the premises. In addition, four firms were doing electronic work in their own premises on sub-contract and under guidance.

Teachers of Science and Technology

The House was told recently of the number of science teachers and technologists in institutions other than schools throughout Britain. Of the full-time graduates teaching in grant-aided establishments of further education in England and Wales during 1951, 1,444 had degrees in mathematics or natural science and 776 in engineering or technology. There were also 37,500 part-time teachers, many with similar qualifications. In Scottish technical colleges there are 158 full-time science teachers and 229 teachers in technology. In the Universities there are about 3,100 teachers of science and technology.

T.V. in West Cornwall

Estimated western limits of effective range of the proposed T.V. transmitter, on Dartmoor at North Hessary Tor, would be along a line from Padstow to the Lizard, Mr. D. Gammans stated recently on information from the B.B.C.

Supplies to Firms in Scotland

Mr. J. MacLeod asked last week how many firms had asked for a supply of electricity from the N. of Scotland H.-E. Board at a lower rate than that to which the Board are prepared to agree. Replying, Mr. J. Stuart said the Board had informed him of approaches by four firms for bulk supplies for electro-metallurgical and electro-chemical processes. The price the firms were prepared to pay was about a quarter to a half of the cost price of producing electricity.

Back Pressure Generation

The Minister of Fuel and Power said last week that consultations were taking place with the Minister of Housing concerning an experimental scheme in regards to back pressure generation in properly balanced domestic and/or industrial power and heating schemes. One such scheme was already in hand. He said he was not aware of any committee set up to investigate the matter, but his Department was advising local authorities.

Generating Capacity

Asked concerning the estimated deficit, expressed as a percentage of maximum generating capacity, at peak hours between November 1952, and February next, of anticipated maximum generating capacity compared with demand, Mr. G. Lloyd said the estimates were inevitably tentative but for a cold spell it would be about 12% and for severe weather about 18%. He added it would be unwise to be complacent in the matter when questioned as to whether the reduction in load spreading would be sufficient to meet all foreseeable contingencies.

Monopolies Report on Cables

Mr. A. R. W. Law, Parliamentary Secretary to the Minister of Supply, stated that correspondence was taking place with trade associations concerned with a view to implementing the recommendations of the report of the Monopolies Commission on the supply of wire and cables. A statement would be made when their observations and proposals had been received.

P.T. and Retail Stocks

On the subject of a reduction of purchase tax on retail stocks, Mr. R. A. Butler said he hoped to announce the appointment of a committee to consider the matter before very long.

Technical Education

The Secretary of State for Scotland has stated in a written answer that the extensions to central institutions providing technical education would give additional accommodation to students entering the civil, mechanical and electrical engineering industries, and the mining, textile, chemical and building industries.

Electric Supply News . . .

Ayrshire

The new steam generating station to be built in Ayrshire under a joint scheme of the B.E.A. and the Scottish Division of the National Coal Board, will have a capacity of 60 MW, it is now stated. It will be the only plant in Great Britain which will use washery slurry, the residue of washed coal, as the actual fuel for the generation of electric power, it is claimed. The slurry will come from the washery plant at a new colliery to be started adjacent to the station.

Bankside

Oil tankers have begun the task of pumping oil into the underground storage tanks of the new Bankside power station on the Thames. This new B.E.A. power station may be in operation next month.

Bridgend

Following the recent breakdown in the supply to the Trading Estate, the South Wales Electricity Board states, the line is being inspected and refurbished, and two new cables will be laid to provide duplicate facilities.

East Midlands

Formal application for permission to change over certain non-standard systems of supply to a.c. 240/480/415V has been made by the East Midlands Electricity Board. The area affected is Burton-upon-Trent and parts of the rural districts of Repton and Tutbury.

Eire

Dry weather over the past three months has caused the Electricity Supply Board to advise consumers to economise in the use of electricity. The inflow to the reservoirs supplying the Board's hydro-electric stations has been almost two-thirds below normal since April last and the generators at Shannon and the Erne are, as a result, working for only a very short period daily, while Poulaphouca Station is temporarily out of operation. To make matters more difficult for the Board, maintenance, repairs and overhaul work is delayed at the steam-powered stations, due to a ban on overtime, it is stated.

Kent

Electricity supplies to Tonbridge, Tunbridge Wells and many villages in the vicinity, were cut off for a short time on Wednesday of last week when the cable of an R.A.F. barrage balloon, which had broken loose 90 miles away, came into contact with power transmission lines at Hadlow, near Tonbridge. An alternative supply was put into effect within 35 minutes.

Kirkburton

Concern at the number of applications from the Yorkshire Electricity Board and the Post Office for overhead lines has been expressed by Kirkburton Highways Committee. It is proposed that the Council write to the County Planning Authority about the committee's growing uneasiness with these requests. The Committee feel that little or no thought is given to the amenities of their charming rural district and urge the necessity of reviewing the present policy on o.h. lines.

Llandovery

The borough council was told at its meeting last week that the recent failure of the town's electricity supply, because of a storm, had seriously affected the local water supply and the sewerage plant. The Council is asking the South Wales Electricity Board to lay an alternative cable underground.

LIGHTING SCHEMES

Doncaster.—T.C. has received Ministry's approval to installation of electric lighting at Cantley Estate, at a cost of £5,600.

Durham.—The T.C. is seeking loan sanction for £3,000 for the provision of lighting in Saddler Street, Elvet, Church Street and Hallgarth Street, and £1,130 for similar work at Akleyheads.

Luton.—T.C. to invite tenders for installation of 42 lighting columns at Leagrave (No. 2) Estate (cost £1,700); and to submit to Ministry for approval a scheme for conversion to sodium lighting of Biscot Road and Cromwell Road at a cost of £2,530.

Newtown.—The U.D.C. has approved an extended scheme of street lighting to cost £4,145.

Oxford.—The Highways Committee is investigating the question of converting the whole of the gas street lighting in the city to electricity.

Sleaford.—M.o.T. has approved scheme for improved lighting on the promenade.

Southend-on-Sea.—The Ministry has turned down an application by the T.C. for consent to borrow £4,000 for the conversion of street lighting in Shoebury from gas to electricity.

St. Helens.—T.C. is seeking Ministry approval to the erection of 66 electric lamps in Boundary Road, Knowsley Road and Eccleston Street.

Sunderland.—The T.C. is to spend £4,000 on improved lighting in Southwick Road.

Sutton-in-Ashfield.—The U.D.C. is to proceed with the high-intensity street lighting scheme on Mansfield Road, and The Lammas, Sutton, at a cost of £2,000, and approval is to be sought for permission to extend this form of lighting along Alfreton Road, and Huthwaite Road.

Tutbury.—R.D.C. recommended to approve scheme for street lighting at Branstone, at a cost of £2,000.

Walthamstow.—Scheme for improved lighting of part of North Circular Road submitted to Ministry for approval.

Company Activities . . .

Dubilier Condenser Co. (1925) Ltd.

A substantial increase in profits is recorded for the year ended March 31 last. The trading profit is £411,212 compared with £214,750 for the previous year. Taxation absorbs £212,293 (*£94,582*) and the net profit is £130,285 (*£70,421*). The sum of £108,566 (*£50,000*) is transferred to reserves and there is £85,830 (*£84,860*) carried forward. The dividend is increased from 20% to 28%, and the board proposes to capitalise £49,260 by issuing a free share bonus of two 1s. Ordinary shares for every five Ordinary held.

Hackbridge and Hewittic Electric Co.

The full account shows current assets totalling £1,873,509 (*£1,487,479*), which includes stocks and work in progress at £998,110 (*£699,384*); current liabilities are £665,207 (*£410,603*). Mr. T. F. Lister, chairman, says that orders on the books at the end of June, 1952, were nearly £1,500,000 greater than at the same date last year, ensuring that at the present rate of production full output should be safeguarded for over 2½ years. Output during the first three months of the current year was well maintained. Referring to the Canadian subsidiary, he says that orders in hand for Canada and the U.S. now amount to $2,250,000.

Hick, Hargreaves and Co.

The trading profit, etc., for the year to March 31 last is £369,967, compared with £348,174 for the previous period. After charging depreciation, pensions and assurance, the net profit is £143,789 (*£140,051*). To plant extension £50,000 (*same*), general reserve £33,000 (*£50,000*), pension reserve £5,000 (*nil*), employees' bonus £15,000 (*£14,000*), and the final dividend is 15%, making 20%. There is £23,010 (*£17,861*) carried forward. Current assets total £1,258,038 (*£1,066,861*), and current liabilities £382,063 (*£287,943*).

Johnson Matthey and Co.

For the year ended March 31 last the group manufacturing and trading profit is £1,776,883 (*£1,740,956*), plus other income of £31,059 (*£32,015*), making £1,807,942 (*£1,772,971*). The group net profit is £580,429 (*£622,175*), of which £404,114 (*£399,998*) is dealt with in accounts of the parent company, plus £1,027,591 (*£839,708*). To superannuation fund £104,000 (*nil*), staff fund £3,500 (*same*), initial allowances tax reserve £13,686 (*£45,296*), stock reserve nil (*£118,494*), dividends £73,177 (*£44,831*), and £1,237,342 is carried forward.

Pinchin Johnson and Associates

The group profit for the year ended March 31 last is £1,958,819 (*£1,648,599*), and with other income the total is £2,027,164 (*£1,739,425*). After all charges, including £1,076,178 (*£844,477*) to taxation, the group net profit is £697,194 (*£649,676*), of which £520,893 (*£552,116*) relates to the parent company. The final Ordinary dividend is 17½%, making 25% for the year.

Revo Electric Co.

A sharp increase in profit is also shown in the preliminary statement of this company for the year ended March 31 last. The profit for the year, including that from a subsidiary acquired during the year, amounts to £170,542 (*£121,763*), after charging taxation of £240,541 (*£165,051*). A final dividend of 22½% makes the year's total again 27½%.

Shanghai Electric Construction

For 1951 the traffic receipts totalled £1,750,652 (*£906,364*), to which is added interest, dividends, etc., of £13,545 (*£7,401*). Power expenses absorb £222,554 (*£160,012*), traffic expenses £754,974 (*£485,904*), repairs and maintenance £438,684 (*£213,969*), general expenses £294,712 (*£199,346*), directors' fees £1,985 (*£934*), and interest on bank loans £52,169 (*£41,337*), leaving a loss of £881 (loss *£187,737*). This loss is added to the deficit of £499,906 brought in, less exchange adjustment of £131,970, leaving the debit at £318,817. Current liabilities and provisions total £999,122 (*£882,938*), less current assets of £563,524 (*£320,802*).

John Thompson

In regard to our note in July 3 issue concerning the new offer of 687,959 Ordinary shares at 14s. 6d. each to Ordinary stockholders, these will *not* be entitled to the final dividend for 1951, but for any interest for 1952 payable on November 1.

Walsall Conduits Ltd.

For 1951, the group trading profit, before taxation, is £440,338 (*£396,004*). Taxation absorbs £230,904 (*£176,983*), leaving a net profit of £209,434 (*£219,021*). The final Ordinary dividend is 35% plus bonus of 15% (*same*), making 70%, and there is £589,337 (*£483,638*) carried forward. Shareholders are to be asked to sanction an increase of £150,000 in the authorised Ordinary capital. The board also recommends a capital bonus issue to holders on the basis of one-for-three, entailing the capitalisation of £50,000 of reserves. The new shares will rank in all respects *pari passu* with existing Ordinary shares except for any dividend or bonus in respect of 1951. Consolidated current assets total £1,326,021 (*£1,146,043*), including stock and work in progress at £480,425 (*£427,315*), while current liabilities amount to £420,294 (*£373,931*). Mr. A. E. Reed, chairman, states that the company has a full order book for all products except ceramics, in which branch cancellation of orders from Australia have had some effect on output.

Commercial Information

HOME

July 18.—Londonderry. Complete electrical installation at Garvagh Intermediate School. J. R. W. Murland, Consulting Engineer, 13 Wellington Place, Belfast. Deposit £3 3s.

July 18.—Londonderry. Electrical installation at Portstewart Primary School extension. F. W. Parkinson and Partners, Consulting Engineers, 6 Murray St., Belfast. Deposit £3 3s.

July 18.—Peterhead T.C. Site works including laying of electricity to about 100 houses at Catto Drive. Burgh Surveyor, Municipal Chambers.

July 19.—Manchester. Electrical installation to main hall and outbuildings, Superintendent's house, and drive lighting at Oakwood Hall, Romiley. City Architect, Town Hall. Deposit £1 1s. (See June 19 issue.)

July 21.—Kingston-upon-Hull. Supply and erection of complete house service wiring installation of some 600 points at new sewage pumping station for West Hull and Haltenprice Joint Advisory Committee. Application should be made by above date to City Engineer, Guildhall. Eventual deposit £5. (See July 10 issue.)

July 21.—Leven T.C. One grit pump with electric motor, starter, etc., and two electrically operated motorised penstocks required in mains drainage scheme. Council's Consulting Engineer, Blyth and Blyth, 135 George St., Edinburgh.

July 21.—Romford T.C. Electrical installation in 440 houses and 11 bungalows on Cross Rd. estate. Borough Engineer and Surveyor, Town Hall. Deposit £2 2s.

July 21.—Sunbury-on-Thames U.D.C. Wiring and equipping for lighting by electricity in 92 houses at Green Lane, Green Leas and Cavendish Rd. Engineer and Surveyor, Council Offices.

July 22.—Bunny (Notts). Heating by electricity of Bunny Church. Vicar's Warden, The School House, Bunny.

July 23.—Glamorgan. Erection of 33 air raid warning sirens within county. R. I. Hicks, county civil defence officer, 8 Museum Place, Cardiff.

July 23.—Goole T.C. Supply of 68 concrete street lighting columns and 68 lanterns, sodium lamps, etc. Borough Engineer, Municipal Offices. (See July 10 issue.)

July 23.—Seaham U.D.C. Electrical work in 42 houses on Westlea Estate. Engineer and Surveyor, Cliff House.

July 23.—Weymouth T.C. Supply of 100 concrete columns and lanterns for street lighting. Borough Engineer, 6 Pulteney Buildings, Weymouth.

July 24.—Dublin. Electrical installation in new buildings at hospital at St. Joseph's, Clonsilla. Nicholas Mathews, Consulting Engineer, 42 Fitzwilliam Place. Deposit £10 10s.

July 25.—Burntisland T.C. Installation of electricity in 207 houses at Rossend. Burgh Surveyor, 41 High Street.

July 26.—Bourne (Lincs) U.D.C. Wiring and installation of electricity in 185 dwellings. Surveyor, North Street.

July 26.—St. Neots U.D.C. Supply and erection of eight concrete columns with lanterns and 100 W tungsten lamps, wiring, etc., on Huntingdon Rd. Estate. Council's Surveyor, Council Offices, Huntingdon St., St. Neots. (See July 10 issue.)

July 28.—Hastings T.C. Electrical installation at Tivoli Primary School. Borough Engineer, 37 Wellington Sq. Deposit £2 2s. (See July 3 issue.)

July 28.—N. Ireland. Electrical installation in 126 dwellings at Rathcoole for N.I. Housing Trust. Trust offices are at 12 Hope St., Belfast.

July 29.—Esher U.D.C. Installation of Class "A" street lighting over 1¾ miles of Portsmouth Rd., including concrete columns, lanterns, 140 W sodium lamps, control gear, fuses, etc. Engineer and Surveyor, Council Offices. Deposit £1 1s.

July 29.—Manchester. Supply of 11 electrically heated drying airing cabinets and 8 cold storage cabinets for various day nurseries. City Architect, Town Hall.

July 31.—Cheshire. Names of contractors for electrical installation work required by County Council for list of contractors and suppliers. Application forms should be returned to E. Mainwaring Parkes, County Architect, The Castle, Chester, by above date.

July 31.—Edinburgh. Power and light installation at wash-house in South Grays' Close. City Architect, City Chambers.

Aug. 1.—Belfast. Supply and erection of (*a*) three-phase l.v. high rupturing capacity switchgear, and (*b*) carbon dioxide fire extinguishing equipments for substations. Electricity Dept., E. Bridge St. (See July 10 issue.)

Aug. 1.—Belfast. Supply of (*a*) 3-phase l.t. oil-immersed circuit-breaker (Spec. No. G.174a), and (*b*) portable electric hoist (Spec. No. G.178). Electricity Dept., E. Bridge St. (See July 10 issue.)

Aug. 5.—Dublin. Electrical installations at Dublin Regional Sanatorium, Blanchardstown, being built. Documents from P. D. Cinneide, Dept. of Health, Custom House. Deposit £20.

Aug. 5.—Keynsham U.D.C. Electrical installation in 48 houses on Park Rd. estate. Engineer and Surveyor, Council Offices, Keynsham, Bristol. Deposit £2 2s.

Aug. 7.—Strabane R.D.C. Supply of one electrically driven sludge pump and other equipment for Sion Mills sewerage scheme. Consulting Engineers, Croasdaile and Taggart, 36-38 Castle Arcade Bldgs., Belfast.

Aug. 8.—Stepney B.C. Installation of power and lighting points in 124 dwellings in Cornwall St. area. Borough Engineer and Surveyor, Municipal Offices, 227-33 Commercial Rd., E.1. Deposit £5. (Advertised in this issue.)

Aug. 8.—Waterford. Public Assistance Board invites tenders for instaliation of internal communication in County Hospital, Waterford, County Home and District Hospital, Dungarvan, and the Fever Hospital, Waterford. Edward R. Ryan, Consulting Engineer, 1 Montpellier Ter., Galway. Deposit £5 5s.

OVERSEAS

Details of items marked may be obtained on application to the Board of Trade, Horse Guards Avenue, S.W.1, quoting reference.*

Aug. 2.—S. Rhodesia. Supply and erection of ventilating plant for new block of flats in Salisbury. Documents from Brian Colquhoun and Partners (Rhodesia), Rhodelect House, Baker Ave., Salisbury. Deposit £2 2s.

Aug. 6.—New Zealand. Supply of Bridge Meg testing sets and rectifiers for Post and Telegraph Dept., G.P.O., Wellington. B.o.T. (Ref. CRE 23820/52).*

Aug. 6.—Portuguese E. Africa. Posts, Telegraph and Telephone Dept., Laurenco Marques, invites tenders for supply of various telegraphic and electrical equipment. B.o.T. (Ref. CRE 23572/52).*

Aug. 12.—Pakistan. Dept. of Supply and Development for the Government invites tenders for supply of various power transformers and rectifiers to sundry specifications. Dept. is at Frere Rd., Karachi. B.o.T. (Ref. CRE 24463/52).*

Aug. 13.—Greece. Supply of 50 portable electric power generating units for Ministry of Education. B.o.T. (Ref. CRE 24521/52).*

Aug. 13.—South Africa. Supply of (*a*) seven panel l.t. switchboard with connections and cable; (*b*) one 20 kW diesel alternator unit and two 75 kW units; (*c*) two 50 kVA and one 150 kVA 11,000/400/231 V power transformers; (*d*) all material and erection of new overhead line network; and (*e*) all material for new lighting and/or power service connections. These for Grobbersdal Municipality. Details from Dr. Jan K. Marais, Transvalia Bldg., 21 Stiemens St., Bloemfontein (P.O. Box 8006), Johannesburg. Cost £3 3s.

Aug. 15.—Uruguay. Supply of considerable quantities of copper wire for bobbins required by Usinas Electricas y Telefonos del Estado. B.o.T. (Ref. CRE 23245/52).*

Aug. 15.—South Africa. Municipality of Mariental want an oil engine driven 10CkW generator with switchboard, etc. Town Clerk P.O. Box 110, Mariental, or consulting engineer, H. Muller, P.O. Box 53, Kakamas.

Aug. 20.—New Zealand. Dunedin Electricity Dept. requires two 3-phase lightning arresters for connection to outdoor 33 kV bus, to protect two 33 kV/11 kV 3 MVA delta/star transformers and switchgear at Port Chalmers and Mosgiel substations. B.o.T. (Ref. CRE 2.931/52)*. Also for supply of 33 kV control panels for the same substations. B.o.T. (Ref. CRE 23879/52).* Same concern also invites tenders by same date for supply of 33 kV switchgear for Halfway Bush substation. B.o.T. (Ref. CRE 23878/52)*.

Aug. 20.—New Zealand. Supply of two batteries and charging equipment for solenoid tripping and closing and indicating circuits for 11 kV and 33 kV switchgear. Dunedin City Corporation Electricity Dept. B.o.T. (Ref. CRE 23880/52).

Aug. 26.—Uruguay. Supply of total of 1,465,000 metres copper conductors with weatherproof insulation for 220 V between phases. Usinas Electricas y los Telefonos del Estado. B.o.T. (Ref. CRE 22784/52).*

Sept. 2.—India. Supply, erection and testing of two 2,800 h.p 2,000 kW turbo-generating sets, two 2,500 kVA 11/33 step-up transformers, one indoor type, remote controlled 11 kV switchgear, one 33 kV outdoor type switchgear, protection and controlling equipment, medium and low voltage a.c. equipment for operation of 400/230 V 50 c/s 3-phase 4-wire system and medium and low voltage d.c. equipment for 110 V system. Chief Engineer, Electricity Development, Govt. of West Bengal, 4 Hastings St., Calcutta.

Oct. 8.—Australia. Manufacture and maintenance of 132 kV and 66 kV outdoor isolated air break switches for State Electricity Commission of Queensland, Scottish Union House, Eagle St., Brisbane, on behalf of Cairo Regional Electricity Board. B.o.T. (Ref. CRE 23333/52).*

Your Queries — Answered

"Barco" drawing machines, makers of? L.E.—Barron and Crowther, Woodside Road, Eastleigh, Hants. (23417)

"Wellco" elements, makers of? T.E.—Etches and Wells, Ltd., London Rd., Knebworth, Herts. (23425)

"Kennedy" benders, makers of? S.L.—Wm. Kennedy, Station Works, Warwick Rd., West Drayton, Mddx.

"Cleanette" multi-purpose kitchen units, makers of? B.C.—H. Fisher (Oldham), Ltd., Glodwick Rd., Oldham, Lancs. (23442)

"Sreeko" shavers, agents for? M.I.—Thompson and Capper Wholesale, Ltd., Speke Hall Rd., Liverpool 19. (23448)

Raspberry barrel cleaning machine, makers of? L.B.—Downs Eng. Works, Ltd., Southfield Rd., W.4. (23454)

"Connor" washing machines, agents for? H.E.—Sterling Eng. Co., Ltd., Sterling Works, Dagenham. (23462)

Further Answer

"Samica" mica foil, makers of? E.C.—Peerless Mica Co. (Aust.) Pty., Ltd., Abbey Barn Road, Wycombe Marsh, High Wycombe, Bucks, inform us that they are the licence holders for this material in this country, and will be manufacturing shortly.

The above are selected from questions we have answered this week. If you have a query, send it to us.

CONTRACTS PLACED

Ceiriog (Denbigh) R.D.C. Electrical installation in 40 houses and six shops and flats on Rhosywaen site, T. Williams, £1,456.

Dagenham T.C. Installation of electricity in 42 flats in Dagenham Rd., Eastern Electricity Board, £1,666.

Eston (Yorks) U.D.C. Supply of electrical equipment for 200 houses, William Marshall (Middlesbrough) Ltd., £2,724.

Newcastle (Staffs) T.C. Wiring, etc., in 39 houses and 8 maisonettes on Earl's Drive Estate, Midlands Electricity Board, £1,050.

Peterborough T.C. Electrical installation in 170 houses on Dogsthorpe North Estate, M. F. Hansen, £4,499.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Attache. 705,531. Class 9. Television apparatus. Avimo Ltd., Herbert St., Rowbarton, Taunton, Somerset.

B. I. Callender's in design. 694,558. Class 9. Electric cable and insulated wires; wiring systems and cable installations, etc. British Insulated Callender's Cables Ltd., Norfolk House, Norfolk St., W.C.2.

Clefa. 706,049. Class 9. Junction boxes, conductors and connectors; and buckle clips, earth clips, bonding bars, etc. Central London Eng. (Fabrications) Ltd., 115 Old St., E.C.1.

Coolie. 707,182. Class 9. Lighting installations and parts thereof and fittings thereof. Benjamin Electric Ltd., Brantwood Works, Brantwood Rd., N.17.

Courier, 705,528 and **Counsellor,** 705,529. Class 9. Television apparatus. Avmio Ltd., Herbert St., Rowbarton, Taunton, Somerset.

Daybrite. B704,150. Class 9. Apparatus for use in the projection of still, motion or television pictures. J. L. Stableford, 1 Stebbing St., Latimer Rd., W.11.

Elpreq. 705,283. Class 9. Electronic apparatus and instruments. Electronic Precision Equipment Ltd., 42/46 Windmill Hill, Ruislip Manor, Middx.

PRICE OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	287 0 0	—
LEAD, good soft pig (foreign)	131 0 0	£128 0 0
" " " "English" quality ...	132 10 0	
TIN (99-99.76%) ... ... (Cash)	972-973	—
" (3 months)	970½-971	—
ALUMINIUM, commercial purity (del.)	157 0 0	—
ZINC	130 0 0	120 0 0
ARMOURING:		
Galv. Steel Wire (0.104 in.) ...	55 0 0	—
Mild Steel Tape (0.04 in.)	39 15 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Elton Industrial Distributors Ltd. Resolution passed at meeting on June 27 for voluntary winding up and A. D. Paton, C.A., 200 Saint Vincent St., Glasgow, was appointed liquidator.

Frank Peasgood Ltd. Resolution for voluntary winding up passed at meeting on June 25 when G. F. Davies, C.A., 3 St. Helen's Place, E.C.3, was appointed liquidator.

Milward (Electrical) Ltd. First and final dividends of 3s. in £ payable at Office of Official Receiver, Somerset House, Temple St., Birmingham, on July 30.

Electrical and Radio Engineers (Golders Green), Ltd. Petition for winding up presented on June 6. Date of winding-up order, July 7.

Cumbrian Electrical Co., Ltd. Resolution for voluntary winding-up passed at meeting on July 4. Fletcher Kenyon of Midland Bank Chambers, Penrith, was appointed liquidator and creditors are asked to send particulars to him by August 4.

Ashtead Electric Cable Drums, Ltd. General meeting will take place at 171 Shaftesbury Ave., W.C.2., on Aug. 18, at 11 a.m., to receive report of liquidator.

Ranelagh Radio and Electrical Co., Ltd. Meetings of members and creditors will be held at offices of R. E. Attwood and Co., 20-21 Lawrence Lane, Cheapside, E.C.2, on July 30 at 11 a.m. and 11.30 a.m. resp.

Regent Radio Co., Ltd. Resolution for voluntary winding-up passed at meeting on July 3 when Mr. R. A. Palmer, of Regent House, 45 Sheep St., Northampton, was appointed liquidator.

Kolar Mines Power Station, Ltd. Resolution for voluntary winding-up passed on June 30. Liquidator, B. G. Riches, OOrgaum, P.O., Mysore, India.

BANKRUPTCY ACTS

Dividends

Portmadoc. Hugh J. O. Evans, electrical engineer trading at High St., Harlech. First and final dividends of 5s. 2½d. in £ payable tomorrow (Friday) at 41 North John St., Liverpool.

Order on Application for Discharge

Kingston - upon - Hull. Robert Walster, electrical engineer and contractor trading in partnership as Davis and Walster at 198 Hessle Rd., Kingston. Date of Order, June 10. Discharge suspended for three months on grounds of refusal of absolute Order of Discharge.

Appointment of Trustee

Guildford. Ronald H. Winslade, electrical engineer of 7 Collingwood Mount, Portsmouth Rd., Camberley. Trustee is Norman W. Osborne, C.A., 11-12 Finsbury Sq., E.C.2.

Intended Dividends

Ashton-under-Lyne. Stanley F. Bent, trading as S. F. Bent and Sons, electrical contractors at 362 Ashton New Rd., Bradford, Manchester. Last day for receiving proofs, July 25. Trustee is F. C. Ormrod, Official Receiver, 20 Byrom St., Manchester.

Truro. William D. Newell, radio and electrical engineer trading at 35 Duke St., Padstow. Last day for receiving proofs, July 25. Trustee is Bernard Russell, 25 Market Place, Camelford.

Warwick. Dennis N. Bateman, trading as Villiers Electric at 1 North Villiers St., Leamington Spa. Last day for receiving proofs, July 26. Trustee is R. K. Clark, Official Receiver, Somerset House, 37 Temple St., Birmingham.

BUSINESS PROSPECTS

HOME

Aberdeen. Approval given to erection of primary school and new portion of infant school at Mastrick, to cost £118,000 and £39,850 respectively.

Adlington (Lancs) U.D.C. Erection of 38 houses on Park Road site. W. E. Mayer, Architect, 12 Cleveland St., Chorley.

Alloa. Plans approved for R.C. church on Mar Street site.

Barking. Approval granted for erection of factory in Alfred's Way by F. F. Goymer.

Blyth T.C. Ministry sanction being sought to loan of £25,000 to finance scheme for bringing electricity to 867 houses.

Chelmsford. Hoffmann Manufacturing Co. Ltd. of New St. are to build factory in Broomfield Chase.

Colchester T.C. Erection of seven blocks of 12 flats each and one block of 18 flats on Shrub-End site. J. S. Orchard, Borough Engineer, 64 West Stockwell Street.

Dagenham Council has approved erection of bleach factory in Church Lane by Cardew Products Ltd.

Darlaston U.D.C. Erection of 132 houses on Bentley estate. Apply to G. R. Rowlands, Clerk of Council, Town Hall.

Darlington. Modernisation of two wings of Greenbank Maternity Hospital to plans by Saxon Snell and Phillips, 9 Bentinck St., Manchester Sq., London W.1.

Dublin. Erection of 140 houses in Donnybrook area. City Treasurer, Exchange Buildings, Lord Edward Street. Also tenders will probably be invited soon for erection of a boys' school at Malahide.

Durham. Application being made for sanction to borrow £203,363 for erection of 150 houses at Framwellgate Moor. Also community centre is proposed at Burnopfield in Stanley area.

Falkirk. Dean of Guild Court has approved erection of 221 houses in Mariner Road and 30 flats in two blocks in Glasgow Road.

Farnham U.D.C. Construction of up to 60 houses on Weydon Lane Estate. Gilbert and Hobson, Architects, 75 Castle Street.

Fleetwood T.C. Erection of 70 houses on West View Estate. Borough Surveyor, Town Hall.

Finchley. Council recommended to approve extensions to factory at Invicta Works for W. H. Perry Ltd.

Glasgow. Erection of 114 flats in area O, 81 in area P, 135 in area Q and 165 in area R of housing scheme at Garthanlock. Director of Housing, 20 Trongate, Glasgow.

Goole T.C. Construction of 72 flats in Alexandra St. Also council is to develop Ilkeston Ave. Estate at estimated cost of £107,772. Plans in both cases by Borough Architect and Surveyor.

Hartley Wintney (Hants) R.D.C. It is proposed to build 100 houses at Phoenix Green. Erection of 99 dwellings at Yateley. P. J. Mitchell, Engineer and Surveyor, Council Offices.

Hebburn (Dur.) U.D.C. Erection of 44 houses on Campbell Park No. 1 site. Engineer and Surveyor, Council Offices, Argyle Street.

Kingston-on-Thames T.C. Proposed that E. R. Babbs and Sons, Quantity Surveyors, 40 St. James's Place, S.W.1, be appointed for development of Park Road site and Bittoms Court and Barnfield Road sites.

Kirkwood. Plans approved for four blocks of (51) houses.

Larne (Antrim) R.D.C. Fifty-two houses to be built at Ballystrudder.

Leicester. Additions proposed to schools on New Parks Estate. Four schools are involved and total cost of scheme is estimated at £19,205.

London. Scheme approved for renewal of electrical installation at Northern Polytechnic (Islington East). Scheme includes 5 new generators, and distribution system. Estimated cost is £15,000.

Louth T.C. Erection of block of four shops and flats, and 20 houses on Eastfield Road Estate. Town Hall, Town Clerk.

Luton T.C. Plans approved for 234 houses on Rambridge Estate.

Middlesbrough T.C. Tenders expected to be invited shortly for electric re-lighting of Central Library. Estimated cost, £1,150.

Newbury R.D.C. Approval sought to erection of 102 dwellings on Love Lane site of Shaw Estate.

Newcastle-on-Tyne. Messrs. Stein are to erect factory in Blenheim St. to plans by C. Solomon, of St. Mary's Place, Newcastle. Thirty-three houses to be built on Montagu Estate. City Architect, 18 Cloth Market.

Nuneaton T.C. It is proposed to built 52 dwellings on three sites.

Oswestry (Salop) R.D.C. Erection of 38 houses on three sites. Architect is S. T. Walker, 83 Suffolk Street, Birmingham.

Poole T.C. Construction of (*a*) 48 flats in twelve blocks at Parkstone, and (*b*) 20 bungalows at Wallisdown. Borough Engineer, Municipal Buildings.

St. Faith's and Aylsham (Norf.) R.D.C. Erection of total of 37 dwellings on various sites. F. M. Dewing, architect, 40 Prince of Wales Road, Norwich.

Shoreditch B.C. Approval given to erection of nine blocks of (120) flats in Kingsland Road.

Sunderland T.C. Another 387 houses are to be built, and quantity surveyor has been appointed for erection of shops and flats at Farringdon and Hylton Red House. Tenders for latter will be invited shortly. Plans prepared for new site at Grindon, where it is proposed to build 1,800 houses.

Swinton (Yorks) U.D.C. Construction of 38 houses and 16 flats on Highfield Farm Estate, and 48 houses on Wood Farm Estate. Engineer and Surveyor, Council Offices.

Tiverton R.D.C. It is proposed to build 100 houses annually for next three years.

Wakefield R.D.C. Plans prepared for 50 houses each at Crofton and Charlston.

Walsall T.C. New electric clocks and interior lighting are to be installed in Council House at a cost of about £11,000.

Whickham (Dur) U.D.C. Erection of 94 houses at Swalwell Bank. Plans by Fennell and Co., Bridge End Chambers, Chester-le-Street.

Windsor T.C. Construction of 50 houses on Manor Farm site. Borough Engineer, Kipling Memorial Building, Windsor.

Wolverhampton T.C. Erection of 100 dwellings to be built within a year. Borough Engineer, Town Hall.

TRADE NOTES

Annual Holidays. The works of the Croydon Engineering Co, Ltd., will be closed between July 25 and August 12.

The Wythenshawe works of Nettle Accessories, Ltd., will be closed between July 25 and August 11. The company's depots at Birmingham, Bristol and London will be open.

Changes of Address. The London Sales Office and the Railway Signalling Department of Nife Batteries have been transferred to new premises at 53, Victoria Street, S.W.1. Tel. : Abbey 1412.

Continental Office. Sunvic Controls, Ltd., announce that, owing to their extending interests in Europe, they have found it necessary to open a Continental Office. Accordingly, their European manager, Mr. B. Hveissel, is transferring to Copenhagen where his address, as from August 15, will be: Sunvic Controls, Ltd., Continental Office, Skindergade 38, Copenhagen K. Denmark. (Telephone: Central 1402).

Lead. As from July 10 the price of good soft foreign lead was reduced by £6 to £131 a ton, delivered.

Rough Copper. The Ministry of Materials has announced that as from July 11 its buying price for rough copper in slabs of from 2 to 3 cwt. was raised from £230 to £235 per ton.

Scottish Office. Wild-Barfield Electric Furnaces, Ltd., and G. W. B. Electric Furnaces, Ltd., have established an office at 131 West Regent Street, Glasgow, C.2. (Telephone Douglas 8839), which is under the control of their existing representative, Mr. D. McDermott.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

B.M.J. (Engineering) Ltd., 5 Belmont Rd., Uxbridge, Middx. To take over business of Herbert Brough carried on at Laundry Yard, High St., Uxbridge, as B.M.J. (Engineering); general electrical, motor and nautical engineers, etc. Cap.: £100. Dirs.: H. Brough and Mrs. A. T. Brough.

Bedford Cold Rooms Ltd., Dane Lane, Wilstead, Beds. Refrigeration and cold storage engineers, etc. Cap.: £5,000. Dirs.: T. Gambriel, L. H. Sugars and W. Saddler.

Electro-Mechanical Components Ltd., Prudential Bldgs., Guildford, Surrey. Manufacturers and repairers of dynamos, motors, armatures, etc. Cap.: £100. Dirs.: A. O. S. Davies, J. C. Turl and Barbara G. Price.

Electronic Computors Ltd., 1213 Stretford Rd., Hall Green, Birmingham. Manufacturers, dealers, merchantsof electric, electronic, mechanical, hydraulic and pneumatic instruments and machines; to carry on consultation, research and development work with the publication of technical general scientific periodicals, etc. Cap.: £2,000. Permt. dirs.: A. Cutts, C. W. George, F. A. Hancox, B. F. Hope and D. G. Reeves.

J. R. Hawkes and Co. Ltd., 146 Belgrave Gate, Leicester. Electrical and general electrical installation contractors, etc. Cap.: £15,000. Dirs.: Hilda Hawkes and J. M. Hawkes.

W. Herbert (Fittings) Ltd., 220 King St., Hammersmith, W.6. Manufacturers of and dealers in electrical supplies and fittings, etc. Cap.: £1,000. Dir.: W. G. J. Herbert.

Radio Gramophone Development Co., Ltd., 11a Sise Lane, Queen Victoria St., E.C.4. Manufacturers of and dealers in apparatus for receiving, transmitting, reproducing or recording sounds, pictures, etc. Cap.: £25,000. Dirs.: W. Harries and T. A. Robins.

Richardsons Westgarth (Hartlepool) Ltd., Northumberland Engine Works, Wallsend, Northumberland. Marine, mechanical, electrical and general engineers, etc. Cap.: £1,000. Dirs.: O. J. Philipson, Sir Summers Hunter, T. P. Everett and W. E. Loveridge.

Ripin Engineers Ltd., 28-9 Wolverhampton St., Dudley. General, agricultural, mechanical, electrical, hydraulic and pneumatic engineers, etc. Cap.: £100. Dirs.: R. B. Ripin and J. E. Farmer.

Rudman, Darlington (Electronics) Ltd., Clyde Works, Lichfield Rd., Wednesfield, Staffs. Manufacturers of and dealers in electrical and mechanical sound and visual recording machines, etc. Cap.: £1,000. Dirs.: J. Rudman, T. Darlington and J. C. Sands.

Spiroto Regulators Ltd., 2 Finchley Rd., N.W.8. Manufacturers and sellers of voltage regulators in accordance with inventions the subject of British Letters Patent Nos. 637,634 and 671,694, or either of them, etc. Cap.: £500. Dirs.: M. Rosenfeld and C. A. Barber.

MEETINGS TO NOTE

THURSDAY, JULY 17

E.I.B.A.—Extra-ordinary and annual meeting at I.E.E., Savoy Place, W.C.2, 11 a.m.

TELEPHONE MANUFACTURING CO.

THE 22nd annual general meeting of Telephone Manufacturing Co., Ltd., was held on July 14 in London, Mr. Fred. T. Jackson, O.B.E., Comp. I.E.E., chairman and managing director, presiding.

The following is an extract from his circulated statement:—

The net profit after tax of the Parent Company is £80,321 as compared with £86,413. The total of reserves and the unappropriated balance of profit and loss account of the Parent Company amounts to £534,040 and, therefore, exceeds the issued capital of the Company.

Direct export business accounted for 31% of our sales for 1951, a smaller proportion than for 1950. Australia, our chief export market, has taken less, but the reduction has been offset partially by increased business in Canada and other countries.

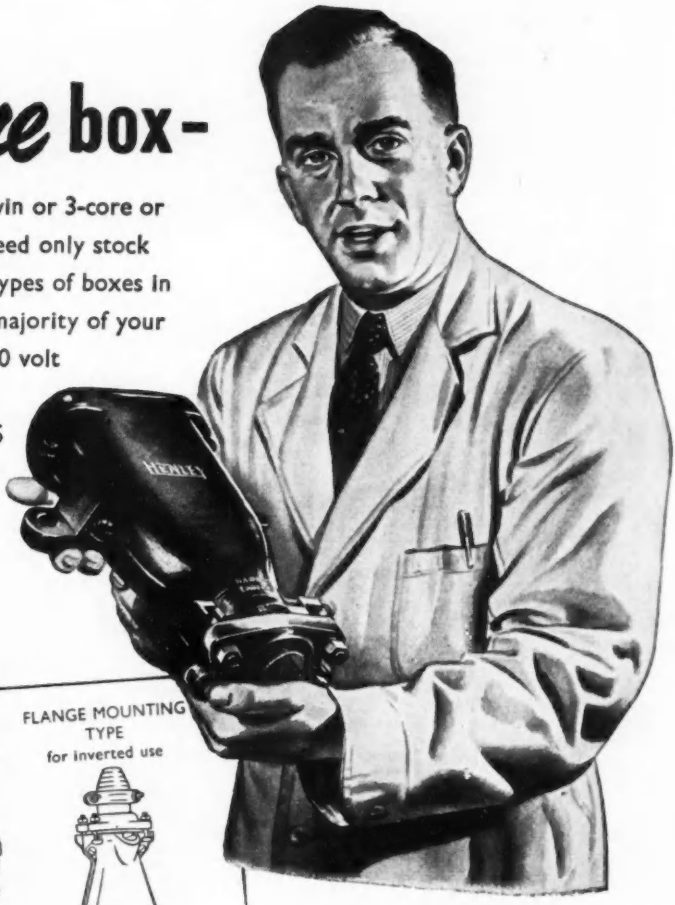
After referring to the progress of the subsidiary companies, the statement continued:—

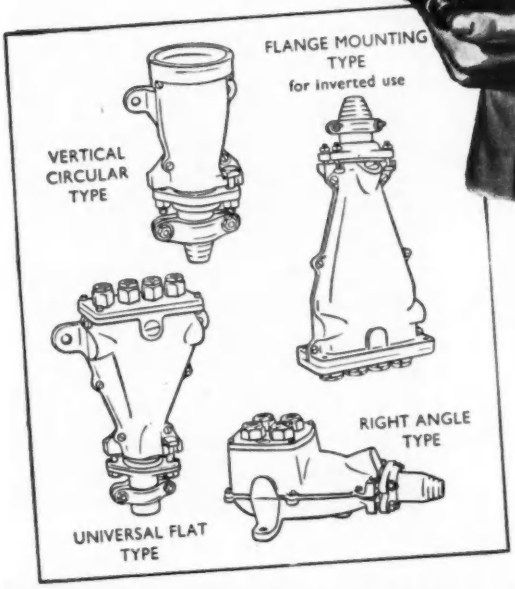
Certain of our development work is now reaching the stage of production, which should result in increased orders from overseas. These projects, together with the additional finance required for orders in hand, will more than absorb our liquid resources. It is, therefore, likely that we shall have to apply to the Capital Issues Committee for permission to raise fresh capital before the end of the year.

The report was adopted and the dividend of 10% approved.

This *one* box-

can be used with twin or 3-core or 4-core cable. You need only stock very few sizes and types of boxes in order to meet the majority of your requirements for 660 volt indoor installations. Henley Catalogue 35 shows which boxes to order.





HENLEY

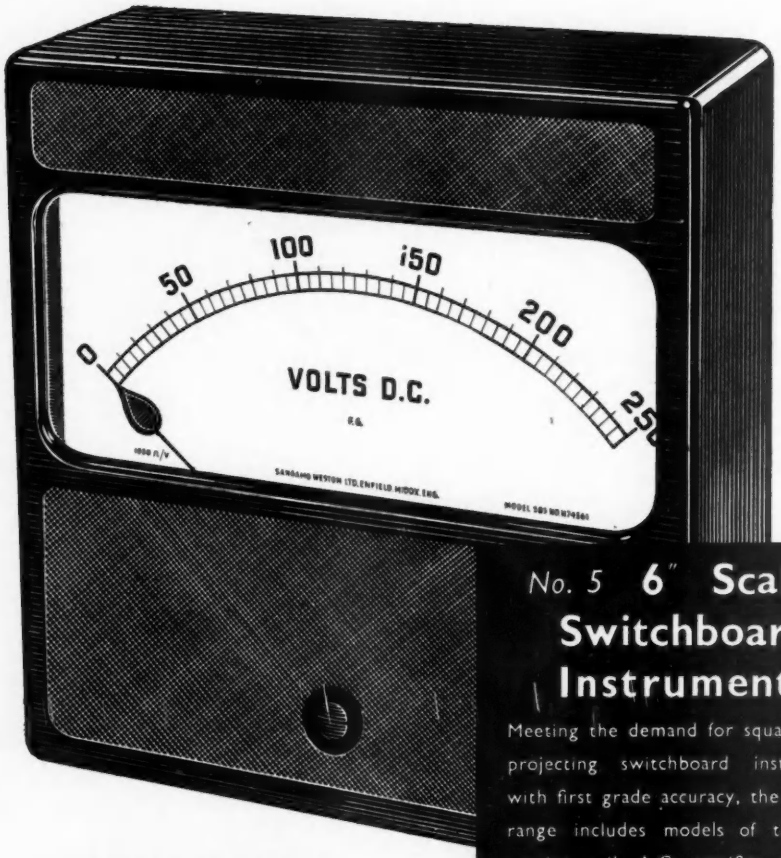
INDOOR

TERMINAL BOXES

660 volts

Please ask for Catalogue 35

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD. 51-53 HATTON GARDEN, LONDON, E.C.1



No. 5 6" Scale Switchboard Instruments

Meeting the demand for square cased projecting switchboard instruments with first grade accuracy, the Weston range includes models of the D.C. moving coil, A.C. rectifier and H.F. thermocouple types, as well as the moving iron type. The model S.83 illustrated, is fitted with a 6" scale and pear shaped pointer for ease of reading. Send for details of Weston switchboard instruments. The full Weston range includes panel, switchboard, portable, sub-standard and laboratory standard instruments.

WESTON

Electrical Measuring Instruments

SANGAMO WESTON LIMITED

Enfield, Middlesex. Tel: Enfield 3434 (6 lines) & 1242 (4 lines). Grams: Sanwest, Enfield

Branches: Glasgow, Manchester, Newcastle-on-Tyne, Leeds, Liverpool, Wolverhampton, Nottingham, Bristol, Southampton, Brighton

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

STEPNEY M.B.C.

ELECTRICAL INSTALLATION FOR 124 DWELLINGS AT CORNWALL STREET HOUSING AREA

TENDERS are invited for the installation of electric lighting and power points at the above-mentioned Housing Scheme.

Forms of tenders and conditions, etc., obtainable from the Borough Engineer and Surveyor, Municipal Offices, 227-233 Commercial Road, E.1, upon payment of a deposit of £5.

Closing date for tenders, August 8, 1952.

J. E. ARNOLD JAMES,
Town Clerk.
(A 436)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts. Salary, including London Allowance, and conditions of service in accordance with N.J.B. Agreement, Schedule "A."

DEPUTY POWER STATION SUPERINTENDENT
Islington Generating Station.

Applicants should have received a sound technical and practical experience in electrical, mechanical engineering and experience in station operation and maintenance on steam and electrical plant. Position provides opportunities for administrative experience and responsibility. Salary—Class "D," Grade 3, £827 8s. p.a.

STATION SHIFT CONTROL ENGINEER
Woolwich Generating Station.

Applicants should possess good technical qualifications and have had sound technical training and practical experience in the control and operation of steam generating plant and main switchgear. Salary—Class "G," Grade 10, £617 8s. p.a.

JUNIOR ENGINEER
West Ham Generating Station.

Qualifications—sound training up to approximately Higher National Certificate standard with practical experience of generating station plant. General duties in station. Salary—Class "H," Grade 14, £504 p.a.

Applications stating age, qualifications and experience to Divisional Secretary, B.E.A., London Division, Ergon House, Horseferry Road, S.W.1, within 14 days of this advertisement. (A 426)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY NO. 754—SHIFT CHARGE ENGINEER at Padiham Generating Station, Lancs. Salary £629 to £660 (N.J.B. E.7). Apply before July 26, quoting vacancy No., to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20. (A 401)

EASTERN ELECTRICITY BOARD

Suffolk Sub-Area 25.52 R.

APPOINTMENT OF SECOND ASSISTANT ENGINEER
(Planning and Development Section)

APPLICATIONS are invited for the appointment of a Second Assistant Engineer in the Planning and Development Section on the staff of the Sub-Area Engineer at Finborough Hall, Stowmarket.

Candidates should have had a sound technical training and experience in the design, layout and operation of systems at voltages up to 33 kV with particular reference to indoor and outdoor sub-station design and system protection. Corporate membership of the Institution of Electrical Engineers or equivalent qualifications will be an advantage.

The salary for the appointment will be in accordance with Class "H," Grade 7, of the National Joint Board Salary Agreement, commencing at £747 p.a. Both future salary and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidate will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications, by letter, stating age, education, technical qualifications and experience, with details of present appointment, should be submitted to the Manager, Suffolk Sub-Area, Eastern Electricity Board, Finborough Hall, Stowmarket, Suffolk, within fourteen days of the appearance of this advertisement. (A 422)

THE ELECTRICITY CORPORATION OF NIGERIA

THE ELECTRICITY CORPORATION OF NIGERIA has the following vacancies on its permanent and contract staffs in Nigeria:—

(a) SUPERINTENDING ELECTRICAL ENGINEER. Corporate member I.E.E. plus a degree in engineering, age 35-45. Overseas experience an advantage. Total salary and allowances £1,600 p.a. Probable permanent post.

(b) ELECTRICAL ENGINEERS. Corporate membership I.E.E. Experience in design of thermal and hydro stations and in transmission. Age 28-35. Salaries within range £1,000 to £1,400, according to experience. Permanent posts.

(c) CIVIL ENGINEERS AND JUNIOR CIVIL ENGINEERS, with experience of power station design, thermal and hydro, or good general experience in reinforced and pre-stressed concrete work. Salaries within range £900 to £1,200 according to qualifications and experience. (These posts are on contract and not pensionable.)

(d) GENERAL ASSISTANT TO COMMERCIAL MANAGER. Preferably electrical mechanical engineer. Experience in all branches of store replenishment and purchasing, both U.K. and Continental. Total salary £1,100 to £1,250. Possible permanency.

These posts carry excellent conditions of service. Furnished quarters at low rental. Low Income Tax. Tours 18 to 24 months. Liberal leave on full pay. Good prospects in rapidly expanding electrical authority. Forms of application and full particulars from E. C. Inston, Liaison Officer in the United Kingdom, Electricity Corporation of Nigeria, The Corner House, Great Peter Street, London S.W.1. (A 319)

LONDON COUNTY COUNCIL

LONDON COUNTY COUNCIL requires (a) TECHNICAL ASSISTANTS, (b) JUNIOR TECHNICAL ASSISTANTS. Should have experience in preparing specifications for electrical installations in buildings, or in negotiating terms for supply and general consumers' liaison work. For (a) Higher National Certificate (Elec.) or equivalent; for (b) Ordinary National Certificate (Elec.) or equivalent. Salaries up to (a) £696, (b) 201s. Apply within 14 days on form from Chief Engineer (quote 52/25), County Hall, London S.E.1. (767) (A 417)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

APPLICATIONS are invited for the following superannuable positions, subject to N.J.B. conditions, in the Chief Generation Engineer's (Operation) Department:—

(a) THIRD ASSISTANT ENGINEER. Salary within Schedule "C," Grade 5, commencing in the range £629 to £765, and rising ultimately to £834.

(b) GENERAL ASSISTANT ENGINEER. Salary within Schedule "C," Grade 8, commencing in the range of £481 to £619, and ultimately rising to £674.

For (a) a good knowledge of electronics, with preferably some experience in the use of ultrasonic instruments for crack detection, is required, and also the possession of Higher National Certificate in electrical engineering or an equivalent qualification.

For (b) the successful applicant, who will be required to assist the engineer appointed above, should preferably have a knowledge of electronics, and experience in the use of ultrasonic instruments. Candidates should also hold the Higher National Certificate in electrical engineering, but those with Ordinary National Certificate will receive consideration.

The successful applicants for both positions will be required to assist in the general work of the Testing Department, which includes the testing of power station plants, and a knowledge of this type of work will be an advantage.

Application forms, available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, should be completed and returned not later than August 2, 1952. (A 423)

SOUTHERN ELECTRICITY BOARD

ASSISTANT ENGINEER (MAINTENANCE)

SWINDON District of No. 2 (Newbury) Sub-Area. Salary N.J.B., Class "E," Grade 11, Column 1 (£504 per annum), N.J.B. conditions of service.

The duties will include general system maintenance with responsibility to the Operation and Maintenance Engineer and liability for standby duties. The qualifications required for the post are a sound technical knowledge to Higher National Certificate standard or its equivalent and experience which will enable duties in connection with a change in the working voltage of the h.v. system from 6.6. kV to 11 kV and change over of l.v. supplies and consumers' apparatus from d.c. to a.c. to be undertaken.

The successful candidate will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme, if eligible.

Applications on the standard form obtainable from the Sub-Area Secretary, 7 Oxford Road, Newbury, and returned to him, in envelopes suitably endorsed, not later than July 28, 1952.

F. W. KEMPTON,
Secretary.

July 17, 1952. (A 421)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following superannuable position. Salary and conditions of service will be in accordance with the National Joint Board Agreement.

STATION SHIFT CONTROL ENGINEER
Ipswich Generating Station.

Salary Class "D", Grade 10 (£511 to £527 p.a.).

Applicants should have reached the standard of the Ordinary National Certificate in electrical engineering or its equivalent, have experience in the operation of a switchboard at a generating station, and be fully conversant with high voltage switching operations and protective systems.

Applications, stating age, qualifications and experience should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, by July 26, 1952.

W. N. C. CLINCH,
Controller.
(A 412)

BRITISH ELECTRICITY AUTHORITY

South Western Division

STATION SHIFT CONTROL ENGINEER required at Portishead "A" Generating Station.

Superannuation Scheme. Salary. N.J.B. Class "J," Grade 10, £660 to £685.

Training and experience in control and operation of steam generating plant and main switchgear essential. Good technical qualifications essential.

Apply by July 25, 1952, stating age, qualifications, experience, present appointment and salary, to R. C. Barrett, Divisional Secretary, 26 Oakfield Road, Bristol, 8. July 10, 1952. (A 411)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the appointment of SECTION ENGINEER based on Pwllheli in the Caernarvon district, No. 4/5 Sub-Area. Salary £629 to £660 p.a. (N.J.B. E/7).

Applicants should possess the necessary technical qualifications to enable them to become Chartered Electrical Engineers, and should have experience in all branches of work associated with design, construction and operation of e.h.t., h.t. and l.t. overhead and underground distribution systems, including indoor and outdoor substation equipment. Ability to speak Welsh would be an advantage.

The appointment is superannuable and subject to medical examination.

Application forms may be obtained from the Manager, No. 4/5 Sub-Area, Electricity House, Rhostyllen, Nr. Wrexham, and should be returned not later than August 6, 1952. (A 425)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

BRIGHTON "A" and "B" power stations. ASSISTANT ENGINEER (EFFICIENCY). Applicants should preferably hold a degree in engineering and be a Corporate Member of either the Institution of Mechanical or the Institution of Electrical Engineers. Extensive experience in the testing and efficient operation of large high-pressure generating plant essential. N.J.B. conditions of service and salary Class "L," Grade 6, £972 p.a. Applications on forms obtainable from Station Superintendent, Brighton Power Station, Portslade-by-Sea, Sussex, to be received by him not later than August 2.

Croydon "B" power station. SHIFT CHARGE ENGINEER. Applicants should have had suitable technical training, together with extensive experience in the operation of modern high-pressure turbine and boiler plant, e.h.t. switchgear and in the administration and control of labour. Preference given to those with n.f. experience. Class "J," Grade 7, £831 12s. p.a., including London allowance. Applications on forms obtainable from Station Superintendent, Croydon "B" Power Station, Beddington Farm Road, Purley Way, Croydon, Surrey, to be received by him not later than August 2, 1952. (A 418)

WAR DEPARTMENT

APPLICATIONS from DRAUGHTSMEN (ELECTRICAL) are invited to fill vacancies in the Fortifications and Works Directorate at Chessington, Surrey.

Candidates must be British of British parentage. They should be neat draughtsmen with adequate Drawing Office experience and have a knowledge and experience of Electrical Engineering including preparation of internal and external lighting and power layouts and distribution schemes; also knowledge of the latest Regulations for Electrical Equipment of Buildings.

Salary: £363 to £612 18s. Overtime payable in addition. Starting salary is fixed according to age, qualifications and experience, annual increases being payable subject to satisfactory service. Posts are temporary but have long-term possibilities. Good canteen facilities exist.

Apply in writing, quoting 2070, giving age, nationality and full details of qualifications and experience, to Employment Exchange, Water Lane, Kingston-on-Thames. (A 431)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the appointment of SECTION ENGINEER (Southport District). Salary £629 to £660 (N.J.B., Class "E," Grade 7).

Applicants should possess sound experience in construction, operation and maintenance of high voltage systems. Applicants should possess the necessary technical qualifications to enable them to become chartered Electrical Engineers.

Appointments superannuable and subject to medical examination.

Application forms obtainable from the Manager, No. 1 Sub Area, Merseyside and North Wales Electricity Board, 24 Hatton Garden, Liverpool, 3. Closing date August 1, 1952. (A 409)

SOUTH-EAST SCOTLAND ELECTRICITY BOARD

Edinburgh Sub-Area

CARTOGRAPHIC DRAUGHTSMEN

APPLICANTS should preferably be experienced in the taking and recording on mans the positions of distribution mains and services when laid.

Salary: N.J.C. Electricity Supply Industry Scale within the range £150 to £430, according to age and experience. The successful candidates will be required to contribute to a superannuation scheme and may require to undergo a medical examination.

Applications, stating age, education, qualifications and experience, should be submitted to the Manager, G. T. Allcock, Esq., Dewar Place, Edinburgh 3. (A 400)

YORKSHIRE ELECTRICITY BOARD

No. 3 (Sheffield) Sub-Area

APPLICATIONS are invited for the following appointment:—

GENERAL ASSISTANT DISTRICT ENGINEER
Rotherham District (Vacancy No. 63/52)

Applicants should have a good general and technical education with practical training in an engineering workshop, or in the Electricity Supply Industry. Experience in the construction, operation and maintenance of H.V. and L.V. underground and overhead distribution is necessary.

Candidates should be prepared to reside in the district. Salary—N.J.B. Class "H," Grade 11, £587 to £607 per annum.

Applications stating the above vacancy number, and giving full details of age, qualifications, and experience, should be forwarded to the Manager, No. 3 (Sheffield) Sub-Area, Yorkshire Electricity Board, Commercial Street, Sheffield, not later than August 1, 1952. (A 410)

SOUTHERN ELECTRICITY BOARD

APPOINTMENT OF ASSISTANT SECRETARY
(ADMINISTRATION)

APPLICATIONS are invited for the appointment of Assistant Secretary in the department of the Secretary to the Board. The person appointed will be responsible to the Secretary for the work of the administrative section at the Head Office of the Board. The salary will be a provisional one within the range £1,250 to £1,750 per annum, and the future salary and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating body.

Applicants should have administrative experience in the Electricity Supply Industry and legal experience would be an advantage.

Applications, to arrive not later than July 25, 1952, should be submitted to the Secretary, Southern Electricity Board, Southern Electricity House, Littlewick Green, Maidenhead, Berks on the Board's standard form obtainable from the undersigned.

F. W. KEMPTON,
Secretary.
(A 428)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

BOILER HOUSE SUPERINTENDENT required at Keadby Power Station, near Scunthorpe. The station will have an ultimate capacity of 360 MW and will be equipped with 360 and 550 k/lb. hr. pulverised fuel fired boilers.

Applicants should have wide experience of pulverised fuel firing and operation and maintenance of high pressure boilers, and preference will be given to candidates who are Corporate or Graduate Members of the Institution of Mechanical Engineers or who hold equivalent qualifications.

Salary £762 to £793 per annum. N.J.B. Agreement, Class "G," Grade 6.

Application forms obtainable from Divisional Secretary (Establishments), British Electricity House, St. Mary's Road, Leeds, 7, to be returned within 10 days of the appearance of this advertisement. (A 407)

MIDLANDS ELECTRICITY BOARD

GENERAL ASSISTANT DISTRICT ENGINEER required in the Stroud District of the Central Gloucestershire Sub-Area. Experience necessary in all branches of distribution work including operation and maintenance of high and low voltage cables and overhead lines, substations, etc. Technical qualifications desirable. Salary £511 to £527 per annum. (N.J.B. Grade "D.10.")

Apply in writing within 14 days, stating age, experience, present salary and position, and quoting Ref. GLOS/T/146 to, Mr. D. Holt, Midlands Electricity Board, 126 London Road, Gloucester.

A. STEPHENS,
Secretary.
(A 429)

KENT COUNTY COUNCIL

APPLICATIONS are invited for appointment in the Buildings Department of an ENGINEERING ASSISTANT (ELECTRICAL) in A.P.T. Grades IV-V (£530 to £620).

Applicants must be Graduate Members of the Institution of Electrical Engineers with good experience in the preparation of schemes, specifications and estimates for all classes of electrical installation work.

Applications, on forms obtainable from the County Architect, Springfield, Maidstone, must be delivered to him within 14 days of the appearance of this advertisement.

W. L. PLATTS,
Clerk of the County Council.

County Hall,
Maidstone.
July 1, 1952.
(A 392)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following posts in the Construction Department of this Division:—

MECHANICAL ENGINEERING DRAUGHTSMEN
(Vacancy No. 59/62)

Candidates should have had experience in the layout of boilers and turbines and auxiliary equipment. Condensing plant, coal and ash handling plant, h.p. and l.p. pipework installations.

ELECTRICAL DRAUGHTSMEN
(Vacancy No. 60/52)

Candidates should have had experience in the layout and installation of e.h.t. and l.t. switchgear, transformers, e.h.t. and l.t. cabling.

The salary for the above positions will be within Grade 4 (£651-£755 p.a.). Grade 5 (£547-£651 p.a.) or Grade 6 (£413-£547 p.a.) according to experience and qualifications.

Closing date for the above vacancies, July 23, 1952.

FIRST ASSISTANT ENGINEER (RESIDENT)
Castle Donington. (Vacancy No. 62/52)

The duties for the above position include general supervision of the erection and commissioning of all mechanical and electrical plant; for example, turbo alternators and condensing plant, feed heating equipment, boilers, pumps, high pressure steam and feed piping, switchgear, transformers and cables, coal and ash handling plant and ancillary equipment. Candidates should be Corporate Members of the Institution of Mechanical Engineers or the Institution of Electrical Engineers, and should be experienced in the supervision of such power station equipment, and in co-ordinating work on site in close collaboration with the Resident Engineer responsible for civil engineering and building works and with Divisional Headquarters staff.

FIRST ASSISTANT ENGINEER (MECHANICAL)
Divisional Headquarters. (Vacancy No. 63/52)

The duties of this position will consist of the preparation of designs and layout of equipment for power stations; drafting of specifications for mechanical plant, supervision of contracts with plant contractors, the approval of design and construction of mechanical plant required for modern power stations generally as outlined under Vacancy No. 62/52. Applicants must be Corporate Members of the Institution of Mechanical Engineers of the Institution of Electrical Engineers and the possession of a university degree in mechanical or electrical engineering will be an advantage. They should have had workshop and drawing-office training, and experience in the construction and operation of modern power stations will be a recommendation.

The salary for the above appointments will be within Schedule "C," Class "AX/DX," Grade 1 (£945-£1,173 p.a.) of the N.J.B. Agreement.

THIRD ASSISTANT ENGINEERS (ELECTRICAL)
Divisional H.Q. (Vacancy No. 64/52)

Applicants should have had a fundamental training in electrical engineering, including workshops, and should preferably have had experience in the manufacture, erection, maintenance and operation of switchgear transformers, electrical auxiliaries, main and multicore cablework, and lighting and heating installations for large power stations. Candidates should possess a university degree or equivalent qualification in electrical engineering.

THIRD ASSISTANT ENGINEERS (MECHANICAL)
Divisional H.Q. (Vacancy No. 65/52)

Applicants should have had a fundamental training in mechanical engineering, including workshops, and should preferably have had experience in the manufacture, erection, maintenance and operation of mechanical plant as installed in modern power stations. Candidates should possess a university degree or equivalent qualification in mechanical engineering.

A salary for the above appointment will be within Schedule "C," Class AX/DX, Grade 5 (£629-£834 per annum) of the National Joint Board Agreement.

SHIFT CONTROL ENGINEER
Longford Power Station. Vacancy No. 66/52.

Applicants should have had a sound training and practical experience in switchgear operation in a modern power station. The possession of technical qualifications is desirable.

Salary will be in accordance with Class "G," Grade 10 (£588-£610 per annum) of the National Joint Board Agreement.

Closing date for the appointment August 7, 1952.

All the above positions are pensionable within the provisions of the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham. PLEASE QUOTE VACANCY NUMBER.

L. F. JEFFREY,
Divisional Controller.
(A 424)

A PROMINENT FIRM of Manufacturing Electrical Engineers wish to engage experienced DRAUGHTSMEN and DESIGNERS for work in the London Area in connection with a completely new range of electric motors. Working conditions and salaries unusually favourable.—Applications in full detail to Box No. 1833, Electrical Times. (A 439)

A LARGE ENGINEERING COMPANY situated within 30 miles of London have a vacancy for a YOUNG ENGINEER as an Electrical Assistant to the Plant Engineer in the Plant and Maintenance Department. Applications are invited from young men not exceeding 30 years of age who hold a degree in electrical engineering or a Higher National Certificate in this subject. The successful applicant will have the opportunity of gaining experience in all aspects of a Plant and Maintenance Department.—The salary will be in accordance with age and experience, and applicants should write, giving details of their age, qualifications and previous experience, to Box L.876, c/o Streets, 110 Old Broad Street, E.C.2. (A 394)

A WELL-KNOWN FIRM of Electrical and Mechanical Manufacturing Engineers needs two REPRESENTATIVES, one for London area, other for Yorkshire, Durham, Northumberland. Both appointments, which carry good salary, commission and expenses, offer exceptional opportunities for young men of marked selling ability. —Box No. 1891, Electrical Times. (A 438)

AIR MINISTRY require MECHANICAL and ELECTRICAL ENGINEERS for duty in their Works Department in connection with the design, operation and maintenance of ground mechanical and electrical works services on R.A.F. stations at home and overseas and on Civil Aviation stations. Appointments will be in two grades: (a) Main Grade, starting salary, £970, rising by eight annual increments to £1,280 per annum; (b) Recruitment Grade, starting salary, age point viz., age 25, £624 per annum rising to £878 at age 34, thereafter rising annually to £970 per annum. Salaries somewhat lower in provinces. Appointments are temporary but have long-term possibilities. A special allowance of up to £1,300 a year according to location is payable in addition to salary during overseas service. Candidates must be natural born British subjects. The minimum qualifications and experience required for both grades of posts are: (i) (a) University degree or equivalent diploma in electrical and/or mechanical engineering and have had at least a two-year apprenticeship, or (b) Graduate or corporate membership of the Institution of Mechanical Engineers or of the Institution of Electrical Engineers with appreciable electrical engineering experience and have served at least a three-year apprenticeship, and (ii) have been employed in a responsible position for a minimum of three years with a well established engineering concern and there have gained wide experience in electrical and mechanical engineering practice.—Application forms, quoting reference D290/52A, may be obtained from Ministry of Labour and National Service, Technical and Scientific Register (K), Almack House, 26 King Street, London S.W.1. (A 434)

APPLICATIONS are invited for the post of HEAD of the Department of Power Engineering and Electrical Technology in the Indian Institute of Science, Bangalore. Candidates should possess a Doctorate or Master's degree in Electrical Engineering of a recognised university and have had 15 years' experience in a responsible position in a large power project or supply undertaking. Experience in guiding research work and knowledge of planning and the execution of large power projects will be an added advantage. The successful applicant will be required to control and direct research in the field of Power Engineering and Electrical Technology, to supervise the teaching staff and to administer the general running of the Department. Salary attached to this post is £2,000 per annum, subject to U.K. income tax plus a tax-free overseas allowance of £1,340 for a married man or £840 (single) for a three- or five-year contract. Special allowances for children whether at post or in the U.K. Allowance made for board and lodging. Free medical attention also available and passage to India and cost of local travel paid.

Further details and application forms from Ministry of Labour and National Service (A.S.12), Almack House, King Street, St. James's Square, London S.W.1, quoting A.12/130E. (A 433)

ASSISTANT DESIGNER DRAUGHTSMAN required by electrical switchgear manufacturers in Devon. Age 25-30, with good technical, mechanical and practical knowledge of medium voltage metalclad switchgear. Applicants must have ability and should have Higher National Certificate or equivalent qualifications. Permanent and progressive position. Starting salary commensurate with experience and qualifications.—Box No. 1895, Electrical Times. (A 442)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

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ANNUAL bonus in addition to generally recognised pay rates. Good working conditions in modern factory with welfare and canteen services and active Sports and Social Club. Conveniently situated with good tube and bus services.

Apply to the Personnel Officer. (A 296p)

CHIEF LABORATORY TECHNICIAN, Nuclear Physics Laboratory, Queen Mary College (University of London), Mile End Road, E.1. Starting salary according to ability on scale £455 per annum by £26 to £559 per annum, plus London Weighting. Applicants must have Electronic, H. V. Electrical Engineering, or High Vacuum equipment experience. Pension scheme. Duties begin August/September by arrangement.—Letters only to Registrar, stating age, experience, present work. (A 404)

EFFICIENCY ENGINEER. Applications are invited for the position of Power Plant Efficiency Engineer in a large industrial undertaking near London. Applicants must have a knowledge of economics as applied to plant operation, and must possess at least Higher National qualifications. Very good prospects for a suitable engineer, with a commencing salary of £950.—Reply to Box No. 1883 Electrical Times, quoting reference TEE/2. (A 402)

ELECTRICAL ENGINEER required. East Midlands Graduate preferred. Apprenticeship with reputable electrical manufacturers. Experienced in design and specification of industrial a.c. and d.c. machinery, transformers, wiring and testing. Fully conversant with I.E.E. and Government safety regulations. Some knowledge electrical power supply and distribution, good mechanical background. Age about 30. Staff pension scheme.—Please submit full details of education, training and experience, and state salary required, to Personnel Manager, Box No. 1875, Electrical Times. (A 387)

ELECTRICAL ENGINEER required with works and drawing-office experience, to calculate quantities and allowances of raw materials and compile schedules for ordering. To assist also with technical and sales correspondence in connection with relays and small electrical equipment.—Apply in writing, giving details of age, education, technical training, experience and salary required, to the General Manager, Hendrey Relays Ltd., Bath Road, Slough, Bucks. (A 393)

ELECTRICAL ENGINEER required by the Division of Atomic Energy (Production), to be responsible for the efficient upkeep and maintenance of the electrical plant in the production group of a large factory at Capenhurst, near Chester.

Applicants must have served a recognised electrical engineering apprenticeship, and have corporate membership of the Institution of Electrical Engineers, or equivalent qualifications. They should have experience of a large scale factory organisation, and in the installation and maintenance of a wide range of industrial electrical plant, together with workshop organisation, particularly for electric motor repairs.

Salary will be assessed according to qualifications and experience within the range £927 to £1,218 p.a. There is a voluntary superannuation scheme. A house will be available within a reasonable time for the successful candidate, if married. Applications to M.O.S., D.At.En. (P), Risley, near Warrington, Lancs, quoting reference 360. (A 435)

ELECTRICAL ENGINEER required for electrical department of works in the North East. Should have a sound practical training, drawing office experience, a knowledge of motor control gear resistance calculations, and preferably some experience of electrical heating for industrial applications.—Apply, giving full details of experience, technical qualifications, age, whether married or single, and salary required, to Box No. 1871, Electrical Times. (A 376)

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

ELECTRICAL INSULATING VARNISHES.—TECHNICIAN, aged 25-35 with experience in Radar, Radio or electrical equipment required to specialise in Insulating Varnishes. Will be trained for service and laboratory work based in London. Previous experience of varnish preferable but not essential.—Please reply, stating age and experience to Box No. 1885, Electrical Times. (A 403)

ELECTRONICS. ASSISTANT to take charge small lab. dealing with test and development, wide range of equipment; must have good technical background and experience.—S.S. Electronics, Ltd., Byron Road, Harrow. (A 293)

GRADUATE ELECTRICAL ENGINEER required for Middle East duty by large oil company to work initially under desert survey conditions on investigation, development and application of protective electrical installations for an extensive cathodic protection scheme. Applicants, with degree or equivalent and preferably several years' industrial experience, should be under 40 and, if married, prepared for initial separation. Generous allowances in addition to salary; pension fund; biennial paid home leave.—Write, quoting No. 230, to Box No. 6004, c/o Charles Barker and Sons, Ltd., 31 Budge Row, London, E.C.4. (A 430)

LARGE AMERICAN FIRM which has been in business over 90 years and has extensive operations in the fields of industry, transportation, foreign trade, banking, insurance and mining in North and South America is interested in engaging Young MECHANICAL, CHEMICAL and ELECTRICAL ENGINEERS, with both technical and practical experience, for employment in South America. —All applications, which will be treated in the strictest confidence, should be as detailed as possible and addressed to Box No. W100, c/o Jackson's, Broad St. House, Old Broad St., E.C.2. (A 406)

LEADING AND SENIOR DRAUGHTSMEN required for Transformer work of the largest class.—Apply by letter quoting "Transformer" and giving full details of age, experience and salary required to Staff Manager, The General Electric Co. Ltd., Witton, Birmingham 6. (A 258)

SALES MANAGER. Electric cable manufacturers require Manager to take full charge of sales organisation. Candidates must have previous experience and some technical knowledge.—Full details of age, experience and salary required, etc., to Box 1887, Electrical Times. (A 413)

SENIOR DRAUGHTSMAN required for work on electrical power resistances and large electric heaters for industrial applications. Previous experience on this class of work desirable but not essential.—Apply by letter with full details, including age, technical qualifications, whether married or single and salary required, to the Expanded Metal Co. Ltd., Stranton Works, West Hartlepool. (A 377)

SHIFT CHARGE ENGINEER, capable of taking full charge of steam power station shifts—station consisting of oil or gas fired-water tube boilers 400 p.s.i. 120,000 lbs/hr and three 8,750 kW turbo-alternators, required for Middle East duty by large British organisation. Applicants, aged 30 to 35, must have had previous power station experience. Substantial allowances in addition to salary; pensionable post; biennial (paid) home leave. No married accommodation for first tour. —Write in detail and quoting No. 190 to Box No. 5996, c/o Charles Barker & Sons, Ltd., 31 Budge Row, London, E.C.4. (A 405)

THE RENOLD AND COVENTRY CHAIN CO., LTD., require a SUPERINTENDENT to take charge of the Electricity Supply and Maintenance Department at Renold Works. The Superintendent is responsible for the installation of electrical services throughout the factory and for the maintenance and overhaul of all electrical equipment, and candidates should have had considerable practical experience in this field. Other essential qualifications include a recognised electrical engineering apprenticeship, H.N.C. in electrical engineering and preferably A.M.I.E.E. Age range 30 to 45 years. The salary will be on a range starting at £730 per annum, and the post will carry participation in the company's pension and profit-sharing schemes.

Applications, giving age and full details of education, qualifications and experience, should be addressed to Employment Manager, Renold Works, Didsbury, Manchester 20, quoting ref. W.24.

Previous applicants for this post are asked not to apply again. (A 437)

REPRESENTATIVES required for certain uncovered areas by a leading firm of manufacturers of electric warming pads and blankets. Only persons having good contacts with the Electrical Trade, Electricity Boards and Leading Stores need apply.—For details, write Box No. 1879, Electrical Times. (A 395)

VACANCIES exist for TEMPORARY PRODUCTION INSPECTORS at a number of Admiralty establishments and in shipbuilding and industrial centres in various parts of the country. The duties cover the production, inspection, test and installation of mechanical, electrical, and electronic equipment for H.M. Ships. They include correlation of manufacturing requirements and capacity, preparation of estimates, and determination of production methods. Candidates, who must be at least 25, should have served a recognisable engineering apprenticeship or have had equivalent training, followed by at least three years' relevant experience in industry or Government Service. They should, preferably, be in possession of Higher National Certificate or equivalent; a lower qualification such as Ordinary National Certificate might, however, be considered. Ex-Service personnel with appropriate training and experience are eligible to apply. Appointments will be unestablished, but successful candidates may have opportunities at a later date of competing for permanent posts. The salary scale is £570 by £20 to £675 per annum and entry will be at the minimum, subject to a deduction of £20 for each year by which the age at entry falls short of 30. An addition of 10% on the first £500 of actual salary and 5% on the next £500 or part thereof will also be payable. Salary rates outside London are a little lower.—Application forms, quoting reference D33/51A, may be obtained from Ministry of Labour and National Service, Technical and Scientific Register (K), Almack House, 26 King Street, London S.W.1. (A 432)

WORKS FOREMAN required for small electrical engineers and rewinders shop, South Coast district. State experience and salary.—Box No. 1843, Electrical Times. (A 294)

WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed. Edgware 5566 (4 lines) —Service Electric Co., Ltd., Stanmore, Middx. (A 19)

CASTINGS. Fisher Foundries, Ltd., Greet, Birmingham, have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham, Victoria 0197. (A 25)

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WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of secondhand machinery and plant for re-use.—W. and H. Cooper Ltd., 176 Brady Street, Bethnal Green, E.1. (A 1)

WANTED. Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock Water-tube boilers. Best prices paid. Prepared to purchase Babcock and Wilcox Water-tube Boilers for dismantling. —Apply, giving full details, to Midland Iron and Hardware Co., Cradley Heath. (A 3)

WANTED, ROTARY CONVERTORS, any size.—Universal, 221 City Road, London E.C.1. (A 9)

WASTE MERCURY. Cash on delivery or on collection London area. Containers supplied. Also aircraft plugs, platinum contacts and precious and all scrap metals in any form. Forward samples.—Belgrave Buyers (E.T.), 5 Belgrave Gardens, N.W.8. MAI. 7513. (A 389)

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COMPANY SECRETARY visiting United States and Canada in October, willing to undertake additional commission.—Box No. 1867, Electrical Times. (A 354)

DIRECTOR visiting United States, end of September, willing to undertake additional commission.—Box No. 1865, Electrical Times. (A 353)

ELECTRO-MEDICAL AND HOSPITAL EQUIPMENT. London and Export Agent with efficient staff, well introduced to hospitals, shippers and direct importers overseas, requires additional agency of reputable manufacturer.—Box No. 1881, Electrical Times. (A 396)

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CABLE, 7·052 P.B.J., 100,000 yards, for sale from stock at well below makers' price, on drums of 5,000 yards.—S. G. Young, 154/6 Blackfriars Road, S.E.1. Tel.: Waterloo 3131. (A 397)

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IMMERSION HEATERS, GRUBB. A limited number of 4 kW still available in 14 in., 26 in., 28 in., and 30 in., at old prices. Provision for intermediate loadings. Fully guaranteed. Immediate delivery.—Write for terms to Distributors, John Owner and Co., Ltd., Springfield Road, Birmingham 13. Tel.: Springfield 2939. (A 284)

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FROM STOCK, MOST SIZES AVAILABLE
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1,500 KW ALTERNATOR by G.E.C., new 1925, wound for 3,300/3/50, 3,000 r.p.m., 0·8 P.F. with direct coupled exciter, air filter, etc.—Burrill, 109 Pencisely Road, Llandaff, Cardiff. Tel.: Llandaff 95. (A 299)

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ONE Davidson Sirocco F.D. FAN, complete with bearings and casing; in good condition. 47 b.h.p. 575 r.p.m. 2-7 WG, 58,700 volume.

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Full details may be obtained from Divisional Purchasing Officer, British Electricity Authority, East Midlands Division, Barker Gate, Nottingham. Quote B.O.T. on all correspondence. (A 440)

TWO 60 h.p. screen protected slip ring MOTORS by English Electric. 400-440 V, 3-phase, 50 cycles, 970 r.p.m. F.L. speed. Cont. rating. Complete with control gear consisting of English Electric oil immersed ratchet starters and ammeter and 100A isolators.

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All above motors have been thoroughly reconditioned and are in excellent condition, having been used by us and therefore been very well maintained. They are only being replaced owing to the installation of individual drives.

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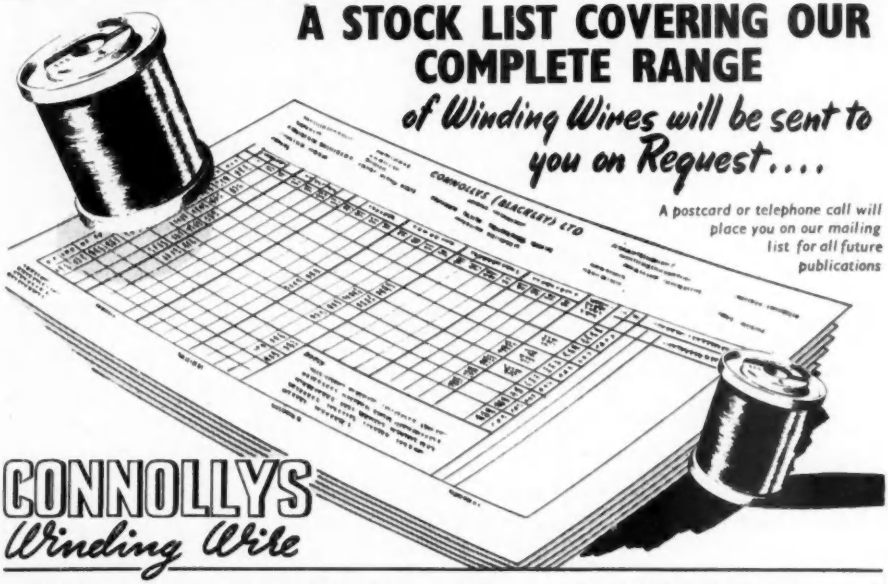

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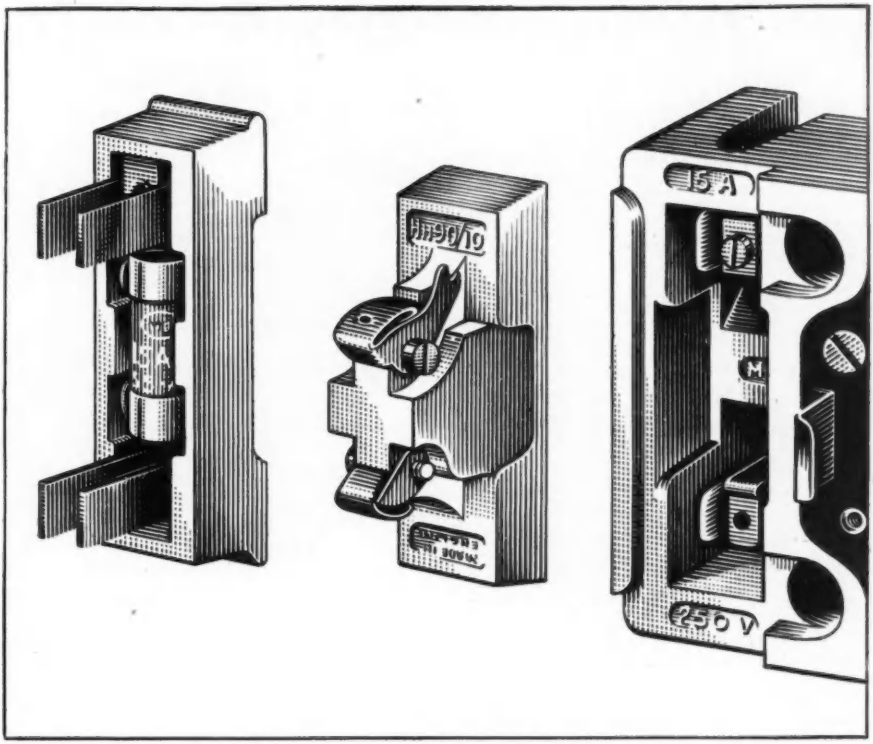

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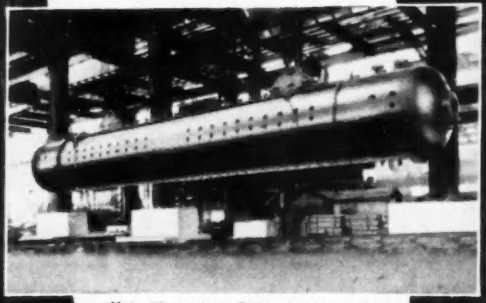

(Main illustration). Boiler during erection showing the walls of the superheater chamber (Inset illustration). Lifting the 65 ton fusion-welded steam drum for one of the Stirling boilers at Keadby.

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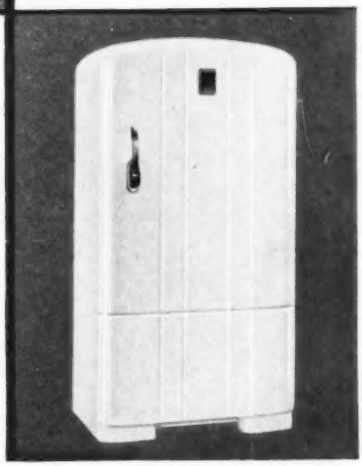

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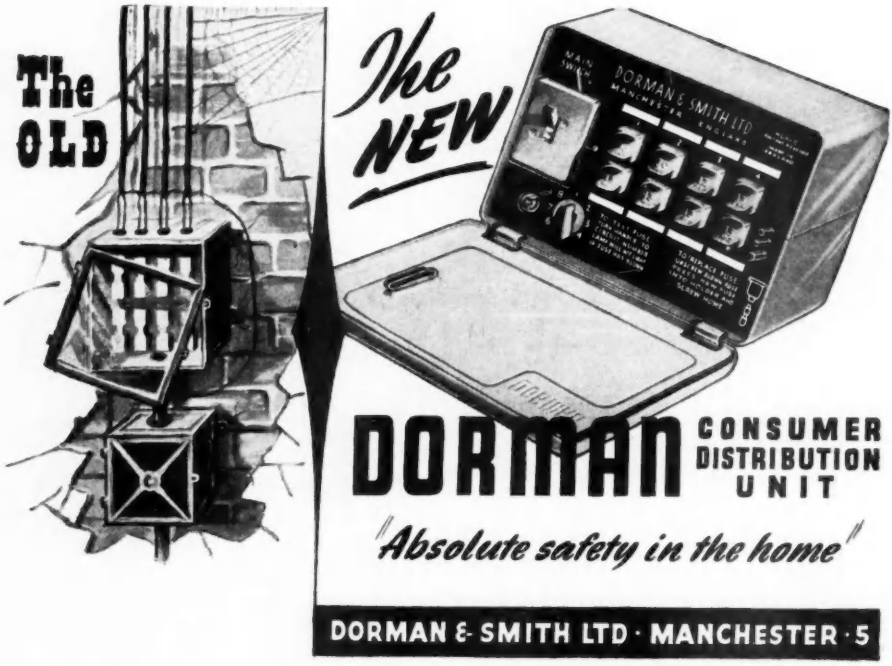

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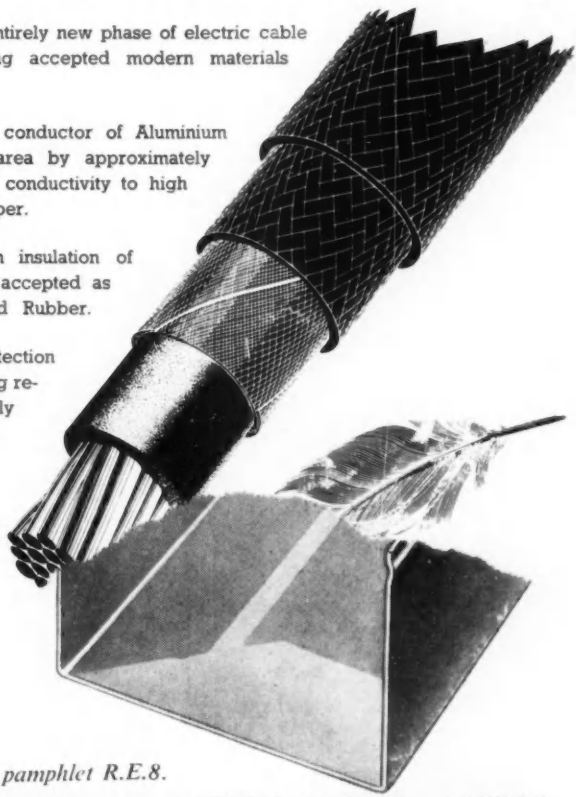

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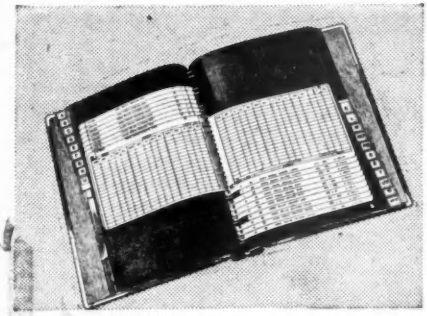

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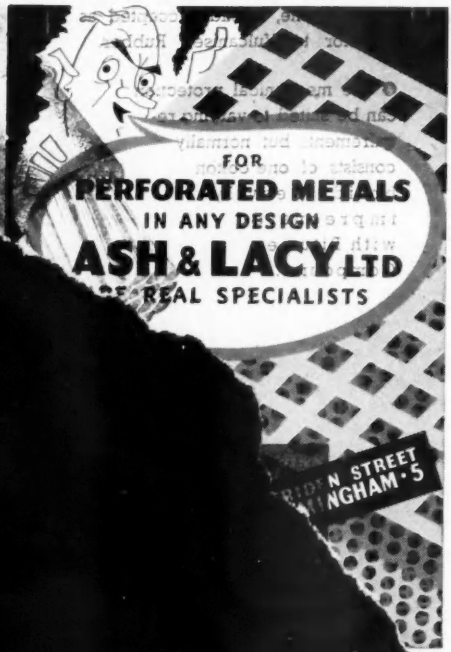

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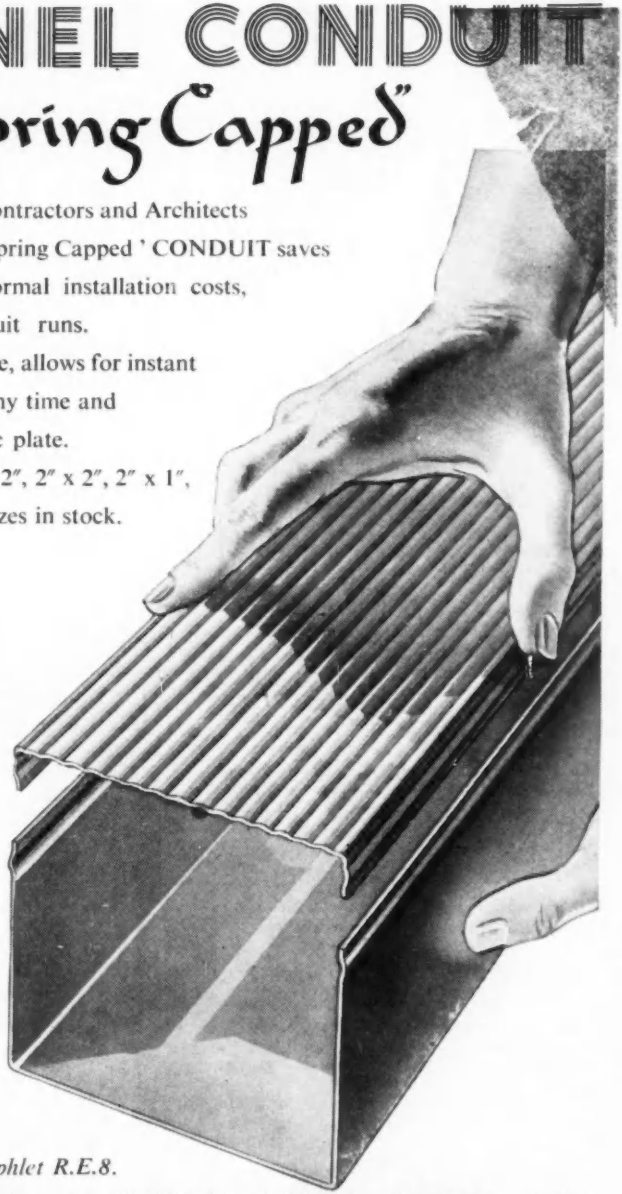

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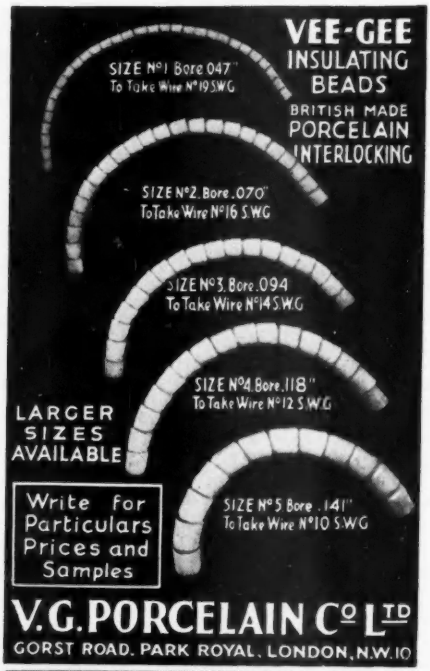

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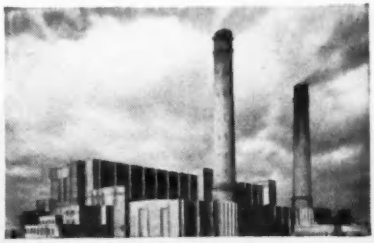

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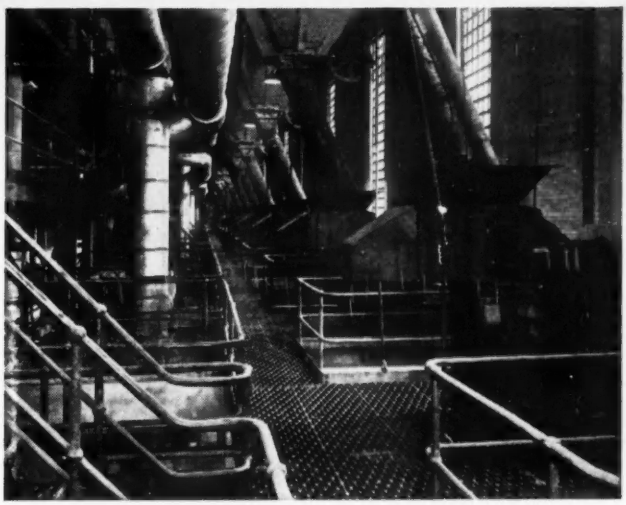

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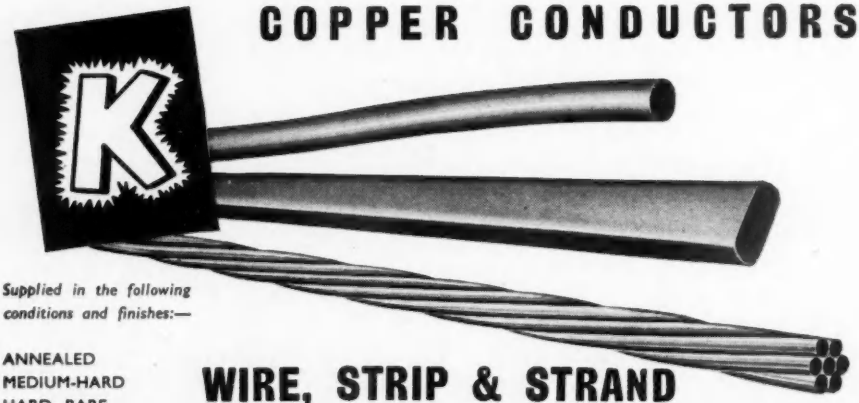

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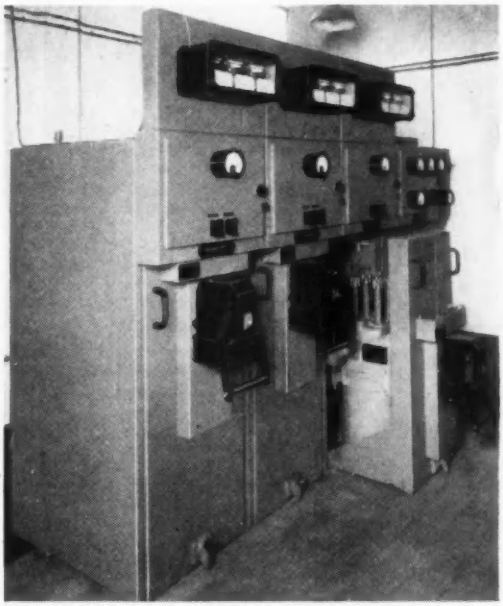

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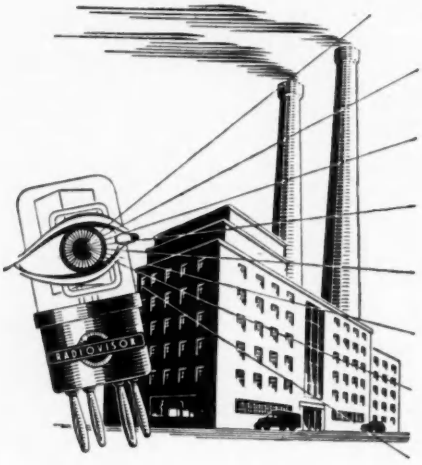

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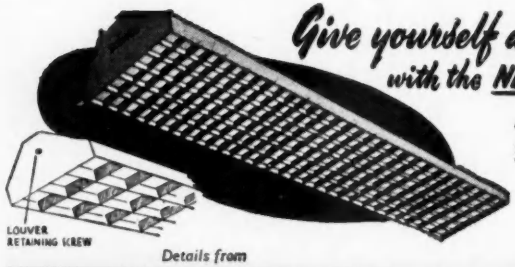

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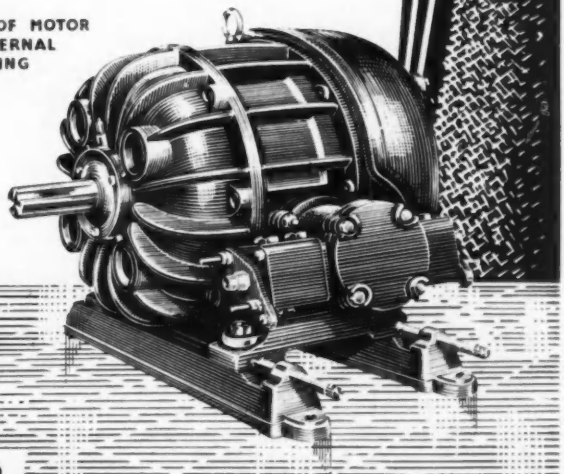

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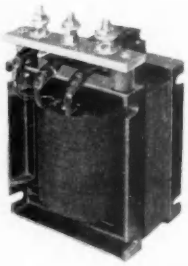

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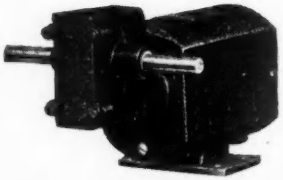

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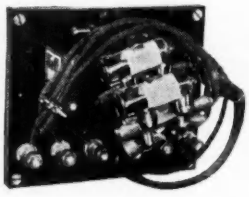

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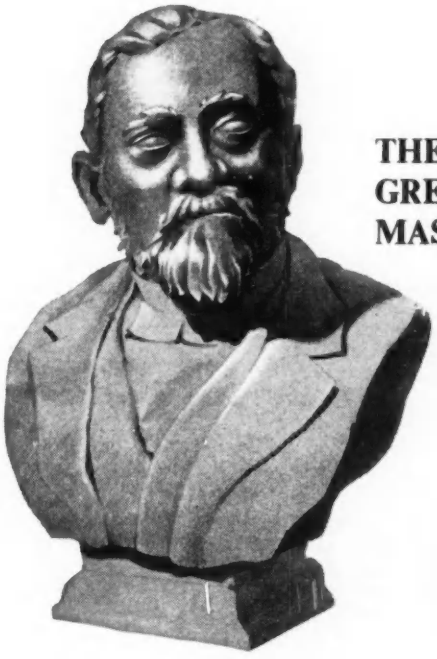

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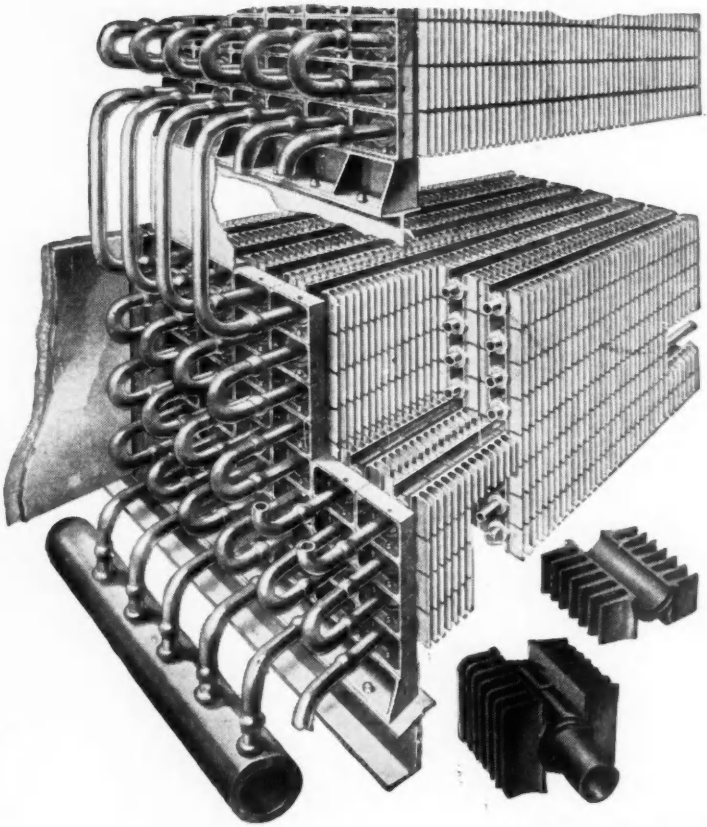

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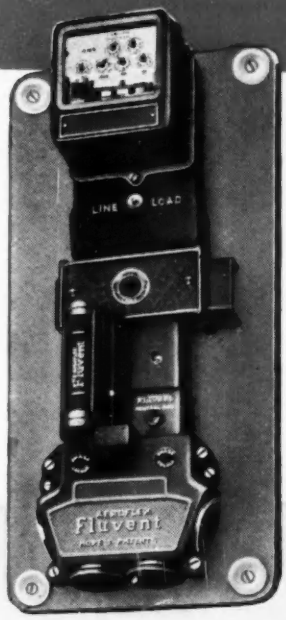

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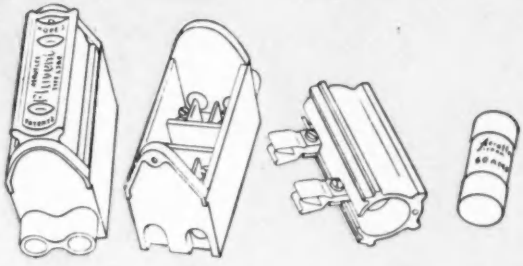

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